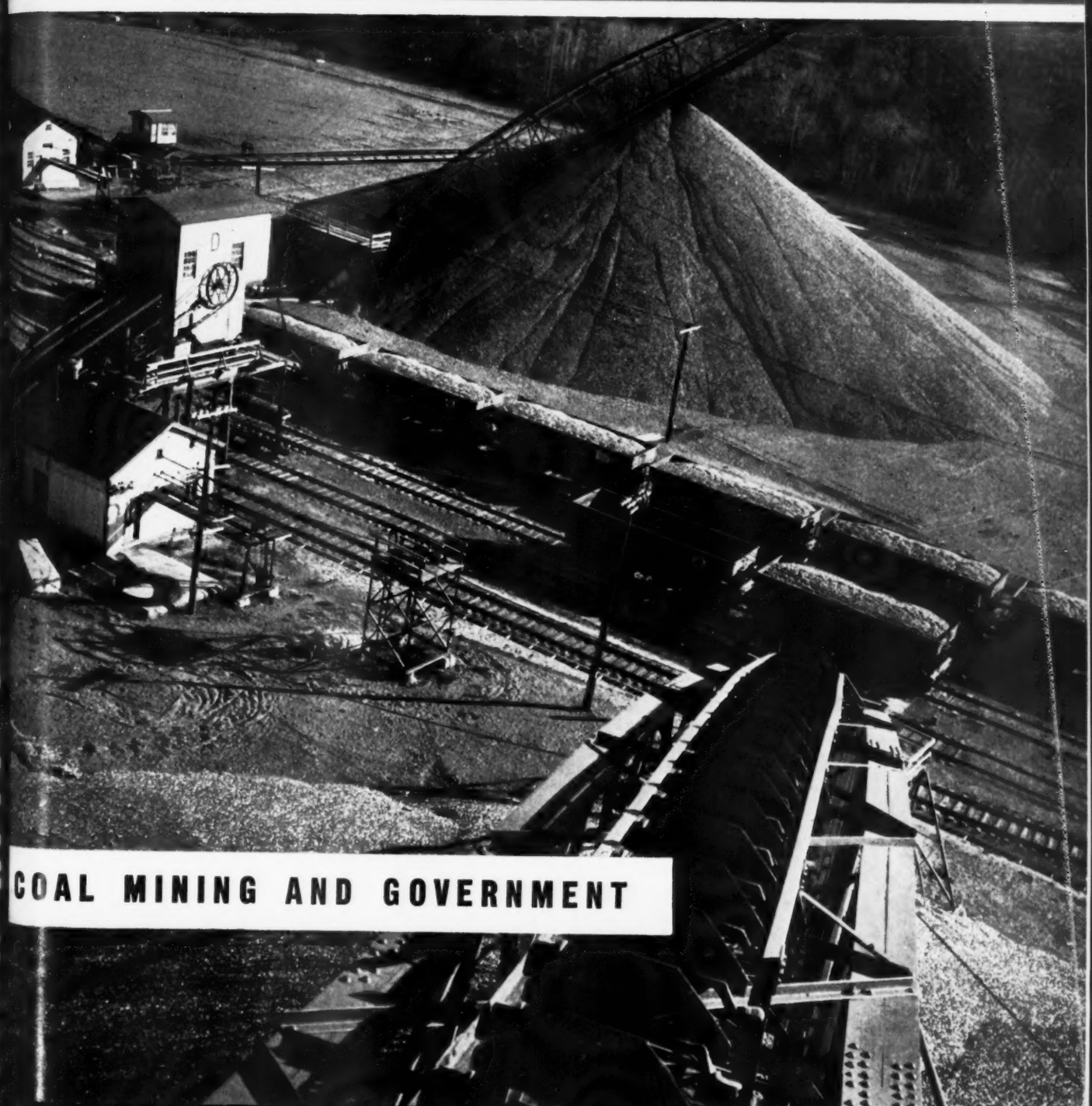
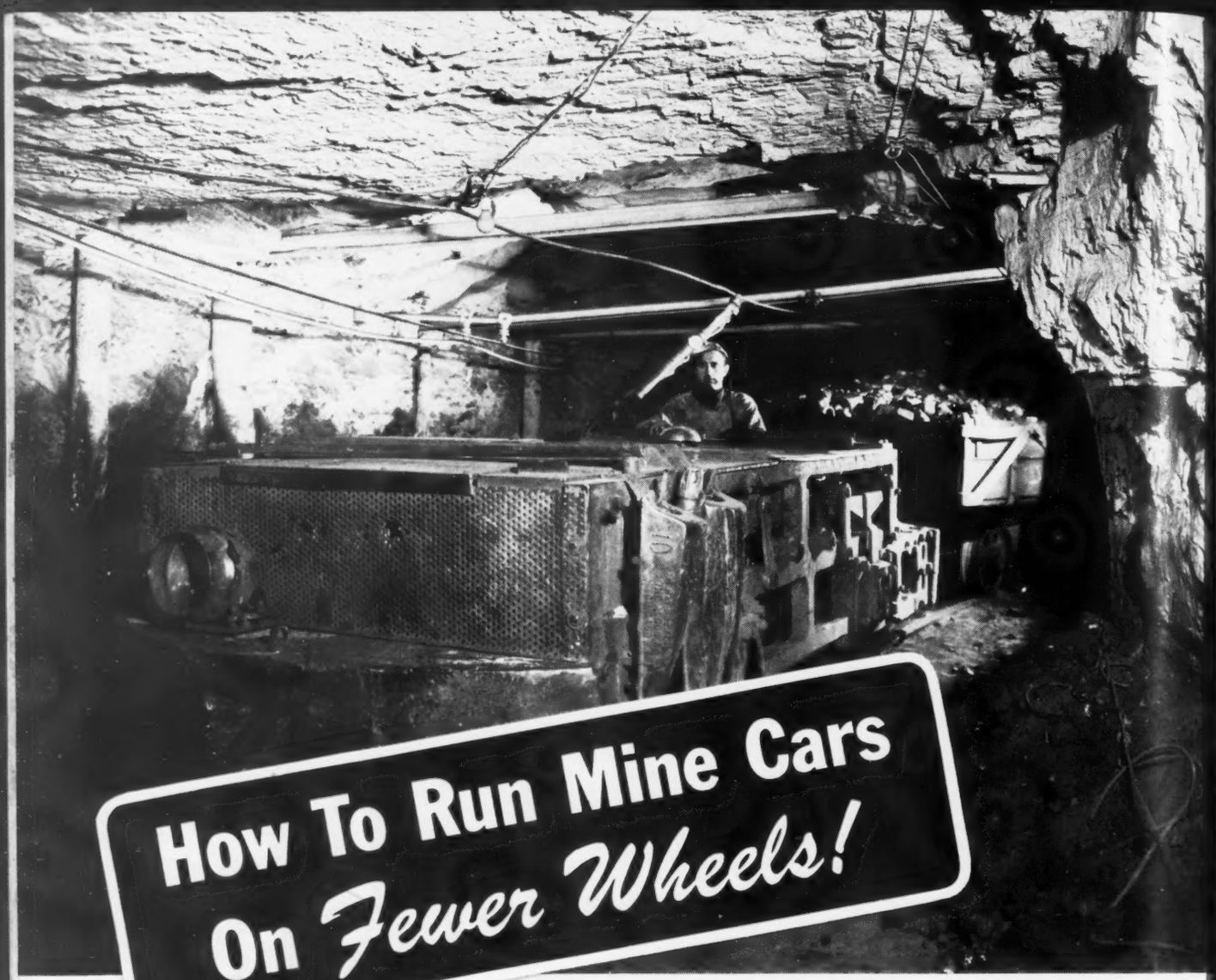
# Coal Age

DECEMBER, 1943



## COAL MINING AND GOVERNMENT



# How To Run Mine Cars On *Fewer Wheels!*

## SUN MINE LUBRICANTS

### "Reduce Wheel Replacements 22%...With 18% Less Grease"

How to get the longest possible service from mechanical equipment . . . and how to avoid production delays are both major problems to every coal mine operator. SUN "Doctors of Industry" and SUN MINE LUBRICANTS have long since proved their ability to help mine operators lick such problems.

Take the case of a Western Pennsylvania coal mine, where car wheel lubrication had always been a sore spot. Some of these cars are equipped with open-hub wheels, others with roller bearing wheels. Up to that time no lubricant had been found that would do a satisfactory job on both types. Acting on the recommendation of a SUN "Doctor of Industry," a switch was made to SUN Mine Car Grease No. 7 for Winter use and No. 9 for Summer use.

The results tell the story! Grease did not separate or solidify in the open-hub wheels . . . Grease consumption was cut down 18% . . . wheel replacements were reduced 22% . . . 3 cars were added to each haul!

In *many* mines . . . both large and small . . . SUN MINE LUBRICANTS have accomplished remarkable results in prolonging the life of all kinds of equipment . . . in saving valuable maintenance time . . . in reducing the cost of lubrication.

Let a SUN "Doctor of Industry" and SUN MINE LUBRICANTS go to work on some of your tough lubrication jobs. Just write to . . .

**SUN OIL COMPANY, *Philadelphia***

*Sun Oil Company, Limited, Toronto, Canada*

SUNOCO

## SUN INDUSTRIAL PRODUCTS

***HELPING INDUSTRY HELP AMERICA***

*In war or peace*
**B.F.Goodrich**
**FIRST IN RUBBER**

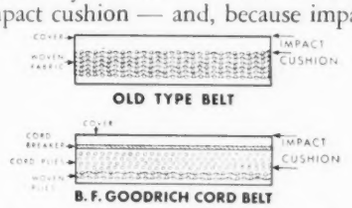
# B. F. Goodrich cord belt carried twice the tonnage of any previous belt

***Record shows two-million-ton load under worst conditions***

THIS was the situation: A 50-50 mixture of sand and rock; intermittent loading; a 10-foot drop from crusher to belt; belt loaded at an angle; crusher jaws designed to pass lumps 10 inches thick but actually passing 12-inch slabs several times a day; some lumps weighing more than 500 pounds. No wonder 1,000,000 tons of material carried was the best that ordinary belts ever did.

But that's the very type of service the B. F. Goodrich cord belt was designed for. And the one installed on this job carried *2,134,721 tons of rock* before it wore out.

The diagram shows why B. F. Goodrich cord belts out-perform ordinary belts by such a great degree. Note the cord plies made up of individual cords encased in rubber. In effect they double the thickness of the impact cushion — and, because impact




resistance varies as the *square* of the cushion thickness, resistance is increased *from 4 to 6 times.*

Note the cord breaker running *across* the belt. That permits a spreading action that resists the cutting and gouging of heavy lumps striking the belt at the loading point. Belt life is greatly increased; ply separation practically eliminated.

B. F. Goodrich cord belts, now being made of synthetic rubber, can be used for all kinds of conveyor jobs and are especially important for the really hard jobs that quickly ruin ordinary belts. If you have such a job in your conveyor system, ask the nearest B. F. Goodrich representative for complete information. Or write, *The B. F. Goodrich Co., Industrial Products Division, Akron, O.*

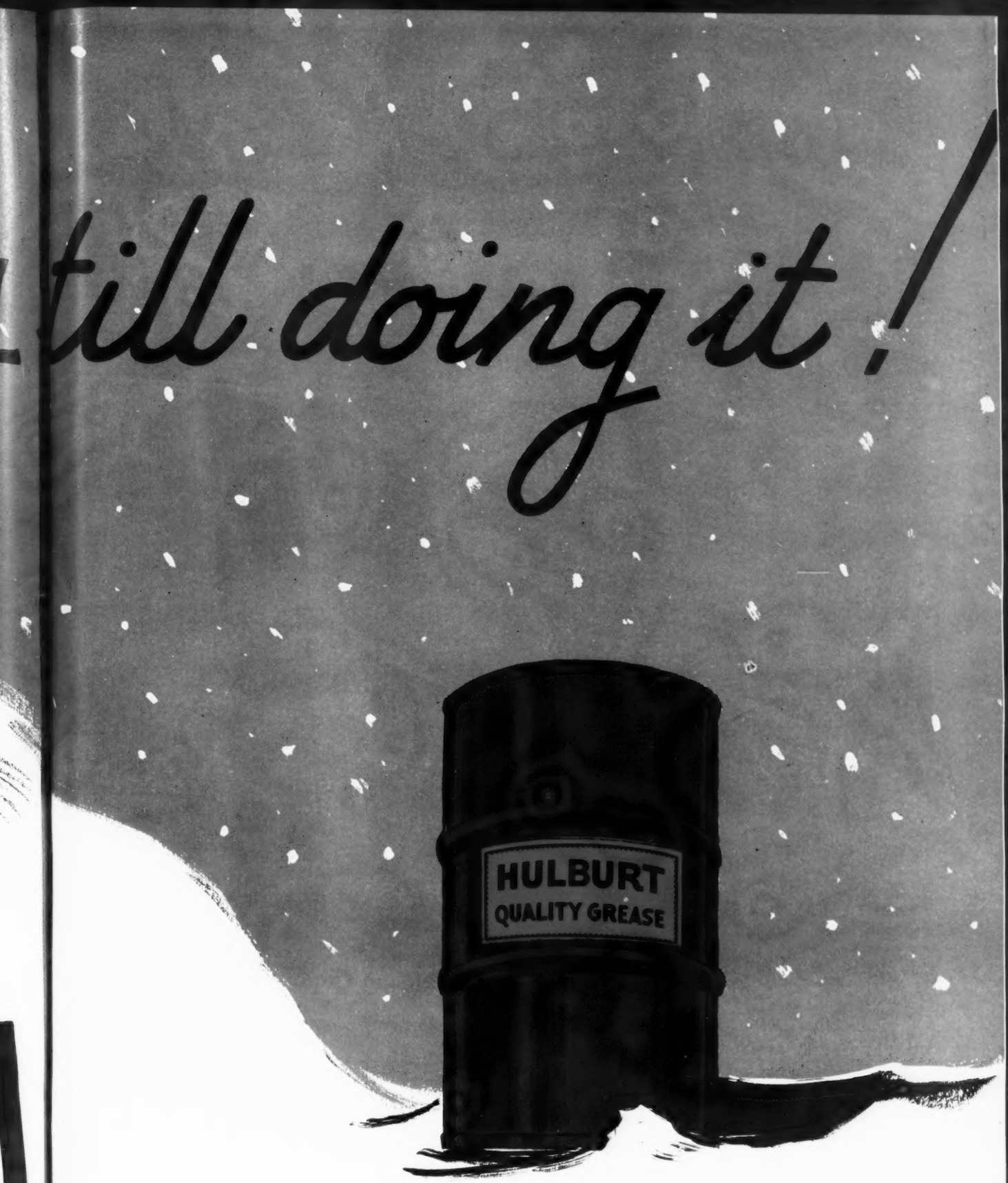
**B.F. Goodrich**

**RUBBER** *and* **SYNTHETIC** *products*

# HE DID ONE THING AND DID IT SUPREMELY WELL — *and he's t*

Ever since 345 A.D., the memory of Nicholas, the good bishop of Myra in Asia Minor, patron saint of children, has meant but one thing to mankind the world over... the undying spirit of Christmas.

Once again HULBURT, maker of but one Quality product for but one purpose, sends forth Saint Nicholas with Christmas wishes to men of goodwill everywhere.



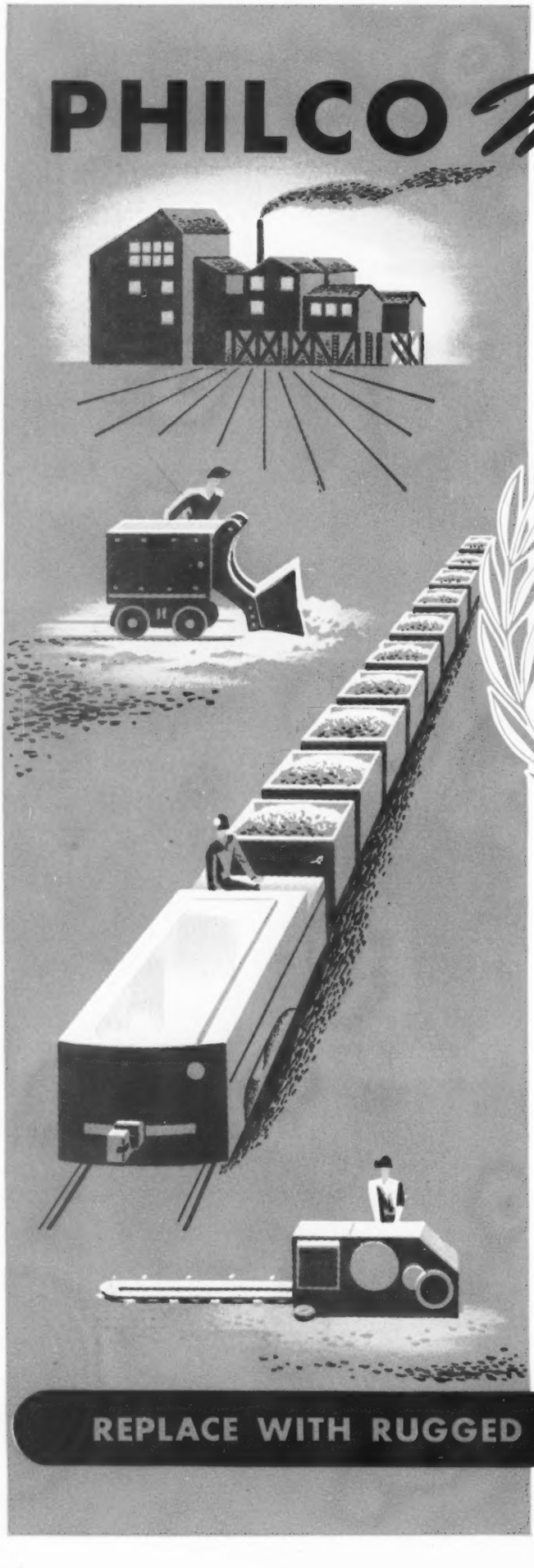

HULBURT OIL & GREASE COMPANY

*Specialists in Coal Mine Lubrication*

PHILADELPHIA, PENNSYLVANIA

# PHILCO *Mine Batteries*

## FOR MORE COAL ON EVERY SHIFT!



TYPICAL PHILCO MINE LOCOMOTIVE BATTERY
MADE UP OF TYPE 25 AMA MONOBLOC UNITS

With rugged, heavy-duty Philco Batteries in your mine locomotives you get the extra wallop you need to move out loaded cars *quicker* and have empties back *faster!* Furthermore, you get this extra wallop *hour after hour* because every Philco mine battery is engineered to deliver *sustained* high voltage! The Philco grid itself is designed to provide high electrical efficiency and superior conductivity. The Philco "K" Process of dehydration permits the use of flake oxide as active material, producing a plate of exceptional hardness, porosity and high capacity. These are important battery features that you get *only in a Philco!* For complete information, write for the Philco Mine Battery Catalog.

*Philco Corporation, Storage Battery Division, Trenton 7, N. J.*

**REPLACE WITH RUGGED PHILCO BATTERIES**

ARMY E NAVY

Coal Age

IVAN A. GIVEN

R. Dawson Hall — J. H. Edwards
Louis C. McCarthy — Fred W. Richart
James R. Sutphen — Paul Wooton
Walter M. Dake, *Consultant*
Capt. Charles H. Lambur Jr. *(on leave)*
ALFRED M. STAEHLE, *Publisher*

A McGRAW-HILL PUBLICATION

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## CHANGE OF ADDRESS

**McGRAW-HILL PUBLISHING COMPANY**
**330 West 42nd Street, New York 18, N. Y.**

**Director of Circulation:**
**Please change my address on COAL AGE**

**FROM** .....

**TO** .....

**SIGNED** .....

# What do you want to know about the coal industry?

ROY SPALTHOFF, New York Riveter, asks:

**Why are there more strikes in coal mining than in other industries?**

There are many people who think as you do, because anything affecting the coal industry is so important that it gets widespread publicity. But the fact is, our contract with the union comes up for discussion every two years, and there are rarely strikes at any other time. Naturally, we wish the record were better. We hope that all future strikes can be avoided. Up to this time, however, strikes in our industry have been spectacular rather than frequent.

ART ROLLINS, Carrizozo, N.M. Druggist, asks:

**Why don't you give miners better working conditions?**

We are working on this problem all the time. Straight through the lean years of the "thirties" we have been shifting the hard work to modern machines. Men formerly had to lie on the mine floor and gnaw at the coal with picks and shovels in doing what is called "undercutting." Today, 90% of the undercutting is done by mechanical gophers, driven by electricity. About 40% of all coal is now loaded into mine cars by mechanical loaders — more will be handled this way as machines become available. These machines also, by saving costs, have helped us to pay steadily better wages. As an official report of the National War Labor Board shows, the wages of coal miners today are twice what they were in 1933.

ELAINE KOTHE, Detroit Secretary, asks:

**Why do miners have to buy in company stores?**

Many people have this impression, but the truth is, miners are free to buy where they please.

Company stores were originally started for the convenience of miners, before the days of the automobile, and before chain stores had grown to their present size.

There are some mining towns today which are served only by company stores. This is likely to be true in towns where mines will soon be worked out, and outsiders do not wish to start in business.

But in most mining towns there are many stores, and chains and independents are welcome. In many cases miners will tell you that company stores are the best in town.

It must be remembered that the bituminous mining industry is made up of many separate companies operating in many towns under many conditions. In all honesty, some company stores are better than others just as some independent stores are better than others.

But, coming back to the original question, there are no rules requiring miners to buy at company stores, and there haven't been any such rules for many years.

BACK THE ATTACK—WITH WAR BONDS

**Bituminous coal is by far America's most important fuel. For that reason we feel that the public has a right to know what kind of industry is providing this coal today.**

**Our business is an open book. Anyone who takes the trouble can dig out any fact he wants to know about it.**

**But we'd like to save you that trouble. So we have invited thousands of people to send us their questions—and in a series of advertisements such as this we'll try to answer the ones which seem to have widest interest.**

**Our story is a big one, and we cannot hope to tell it all at one time.**

**But we believe the more you know about it, the more you will realize that we try to live up to our duties to our country, our customers, and the people who work for us.**

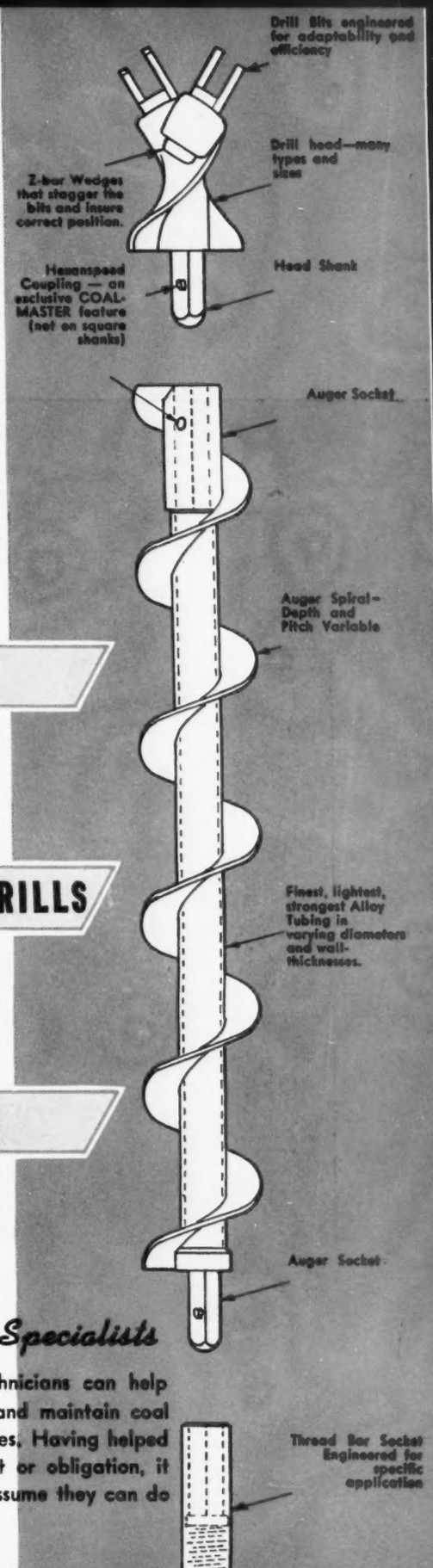
**BITUMINOUS COAL** *Institute*

**60 East 42nd Street New York 17, N.Y.**

COALMASTER

# Design

## IS YOUR ANSWER TO SMOOTH PERFORMANCE ... SPEED AND ECONOMIC PRODUCTION


Drill Bits engineered for adaptability and efficiency
Drill head—many types and sizes
Z-bar Wedges that stagger the bits and insure correct position.
Hexanspeed Coupling — an exclusive COAL-MASTER feature (not on square shanks)
Head Shank
Auger Socket
Auger Spiral—Depth and Pitch Variable
Finest, lightest, strongest Alloy Tubing in varying diameters and wall-thicknesses.
Auger Socket
Thread Bar Socket Engineered for specific application

### *Tools* FOR HAND DRILLS

★ The COALMASTER Safety Hex Shank and Drill Socket protects the driller and speeds production.

### *Tools* FOR POST AND MACHINE MOUNTED DRILLS

★ COALMASTER drilling tools are made in sets — many variations — for all powder sizes to 2" — all Cardox and Airdox shells to 3-9/16" — all Hydraulic cartridge requirements.

### *Tools* FOR STRIP PIT DRILLS

★ The COALMASTER Hexanspeed Coupling is a quick make and break connection for fast, accurate hole production — and resultant economy.

### *Help from Specialists*

★ Our expert technicians can help you to speed up and maintain coal production schedules. Having helped others without cost or obligation, it is reasonable to assume they can do likewise for you.

COALMASTER

BLAST HOLE DRILLING *Tools*

**CENTRAL MINE EQUIPMENT CO.**

ST. LOUIS, MO.

# *Entry Driving...Room*

## *with* GOODMAN DUCKBILLS

1113

ARMY E NAVY

GOODMAN MANUFACTURING COMPANY

# *n Work.. Pillar Drawing*

# L SHAKER CONVEYORS

11242

Photos show a Goodman Duckbill loading out at the face; coal being conveyed by Goodman shaker conveyor to entry; discharge from several shaker units being transported by Goodman belt conveyor.

In advance work and on retreat Goodman Duckbill shaker conveyors handle coal cleanly and quickly. From working face to discharge point there is no delay. Man power is conserved, dead work reduced to minimum, tonnages increased.

1241

HALSTED STREET AT 48TH • CHICAGO 9, ILL.

# ✓ Speed up haulage,
# ✓ Save man-hours
# with Prefabricated Trackwork

Is slow haulage, caused by too many derailments, or too much time out for emergency trackwork repairs, holding back your Victory tonnages?

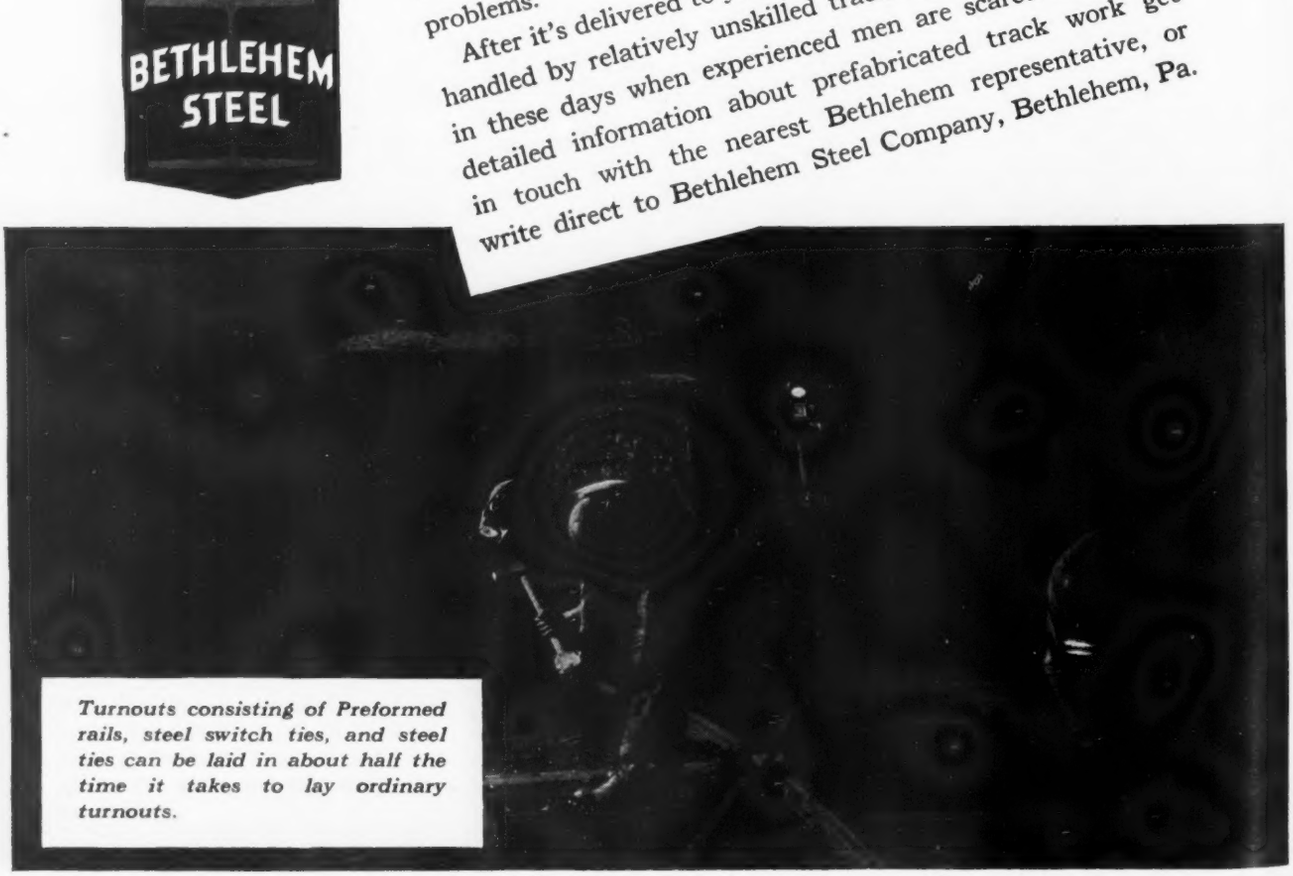
Bethlehem has a new cure for these ailments—Prefabricated Trackwork.

You no longer need to cut, bend, curve and fabricate trackwork at your mine. You can simply check over your needs with a Bethlehem engineer, and the work will be done accurately and at minimum cost in Bethlehem's shops.

This "packaged" trackwork will speed up your haulage system—save man-hours in laying track and making repairs—and save you needless headaches in facing fabrication problems.

After it's delivered to your mine, "packaged" track can be handled by relatively unskilled track layers—an advantage in these days when experienced men are scarce. For more detailed information about prefabricated track work get in touch with the nearest Bethlehem representative, or write direct to Bethlehem Steel Company, Bethlehem, Pa.

BETHLEHEM STEEL

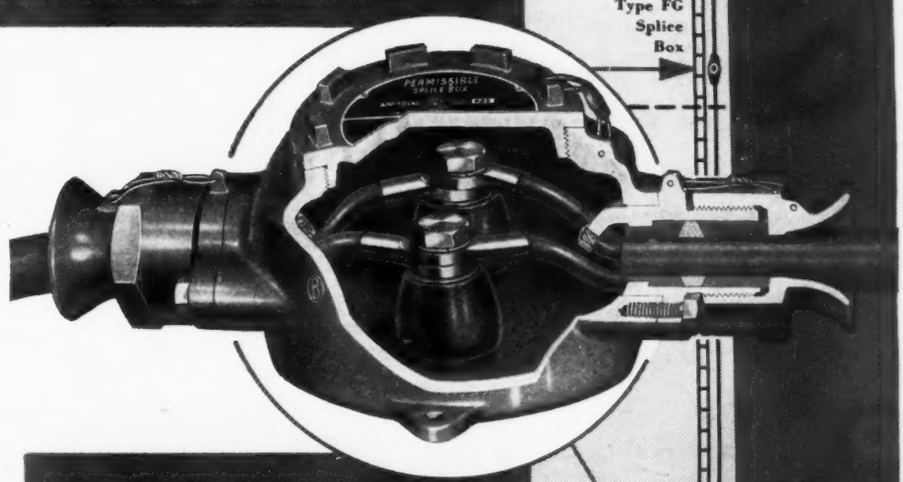


*Turnouts consisting of Preformed rails, steel switch ties, and steel ties can be laid in about half the time it takes to lay ordinary turnouts.*

## HOW TO CONSERVE

# Rubber-Covered Trailing Cables?

# THE ANSWER IS SECTIONALIZATION--



## --the O-B Type FG Gas-Proof Splice Box provides the Means

### HOW SECTIONALIZATION WORKS

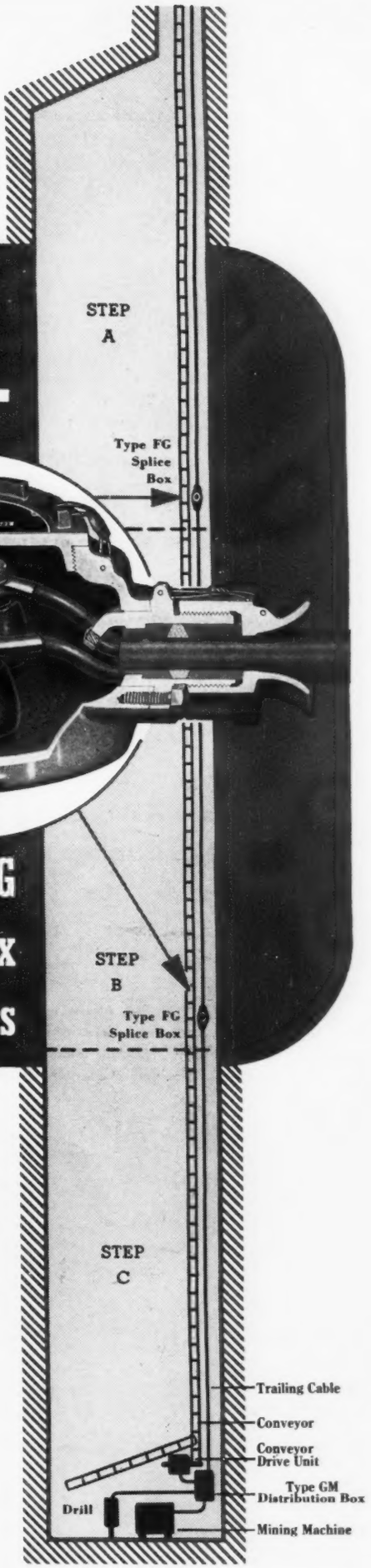
Instead of using one trailing cable, the length of a finished room, sectionalize your cable into several shorter lengths. Start working with just one section (step A). As your room progresses beyond its limits, bolt on another section (step B), repeating the process until the full length of the room is reached (step C). You'll save cable in these important ways:

No excess cable in service vulnerable to mechanical damage ● Amount of cable energized and subject to heat deterioration kept at minimum ● Cable sections may be shifted from room to room as needed ● Defective sections easily removed for repair with minimum shutdown.

**Write for Booklet 778M**

Glands assembled and sealed on cable ends...No need to repack in making or changing connections ● Approved by U.S. Bureau of Mines for use in gaseous areas ● Only four bolts to tighten for positive, gas-tight splice ● Permanent, boltless safety ground connection.

2433-M




**Ohio Brass**

MANSFIELD, OHIO

CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

# Coal Mining

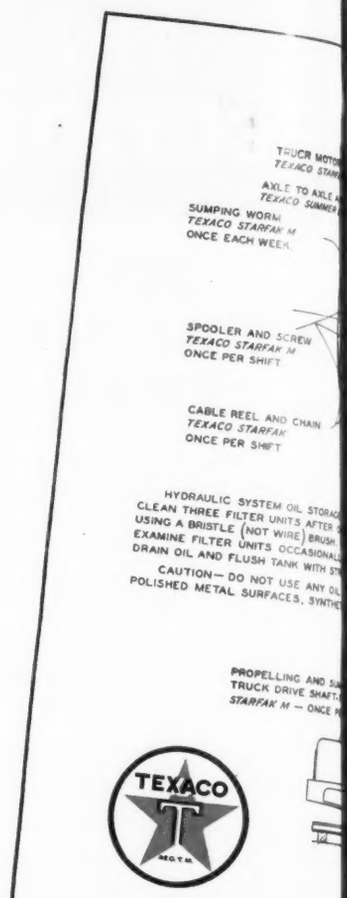
Coal mining is at its all-time high . . . despite 150,000 fewer men and some 1,500 fewer mines than in the previous record year. The reason is *mechanized equipment.*

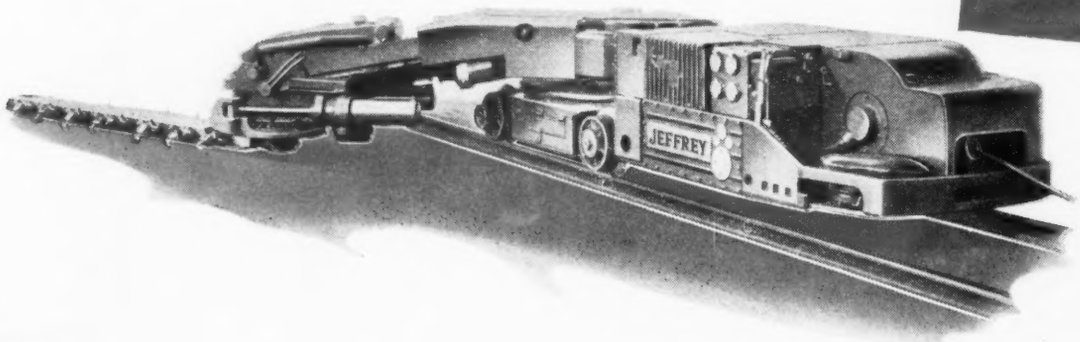
A sure way to keep your cutters, loaders, locomotives, shuttle cars on the job is to follow *Texaco Maintenance Lubrication Charts.*

These Charts show clearly just *where, when* and *with what* lubricant to service each lubrication point of various makes of cutters, loaders, locomotives, etc. . . . *with lubricants approved by the manufacturer.*

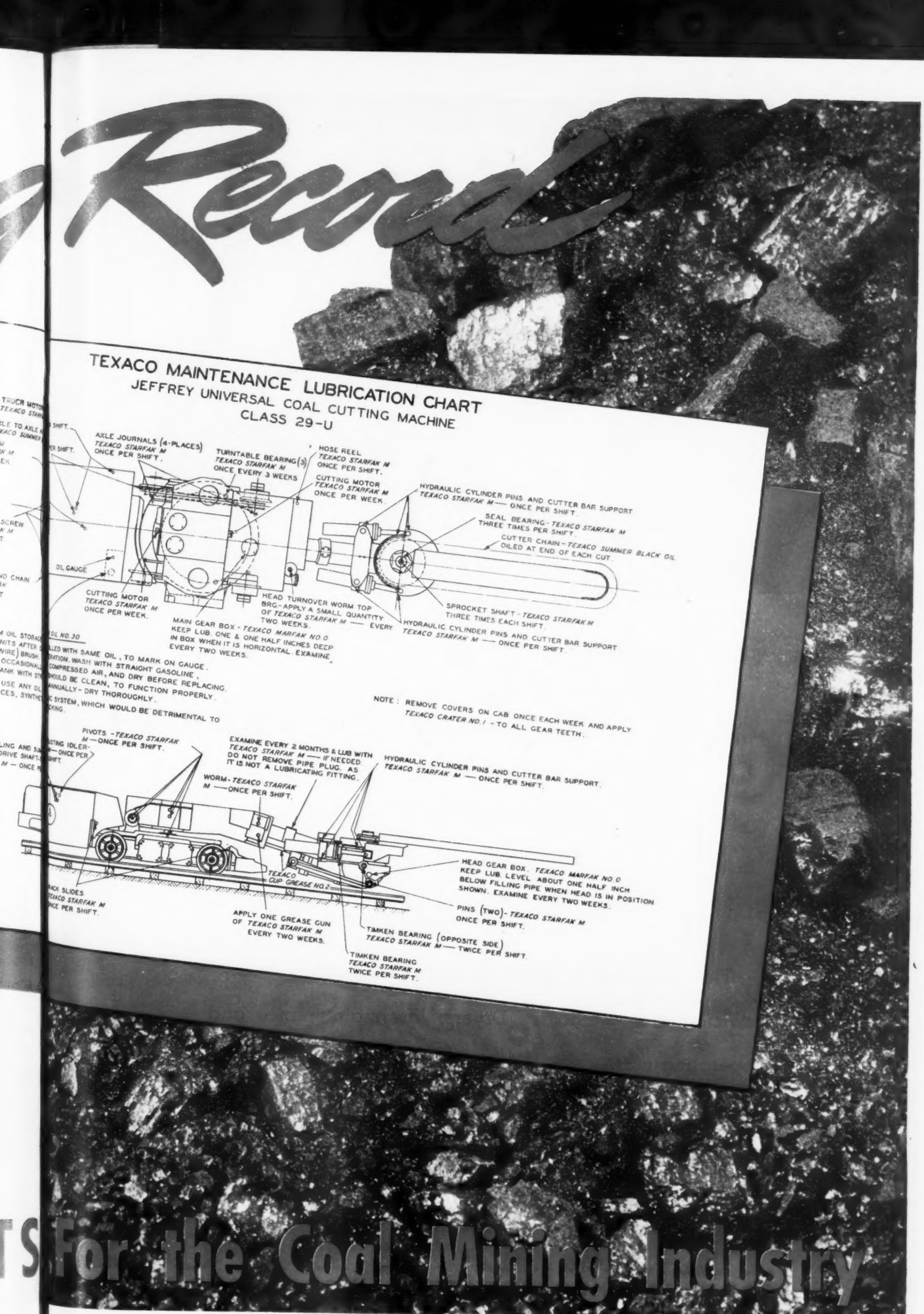
The actual charts are 12″ x 18″ in size, for displaying at all lubricating stations. Order those you need by make and model from The Texas Company, *National Sales Division, Dept. C,* 135 East 42nd St., New York 17, N. Y.

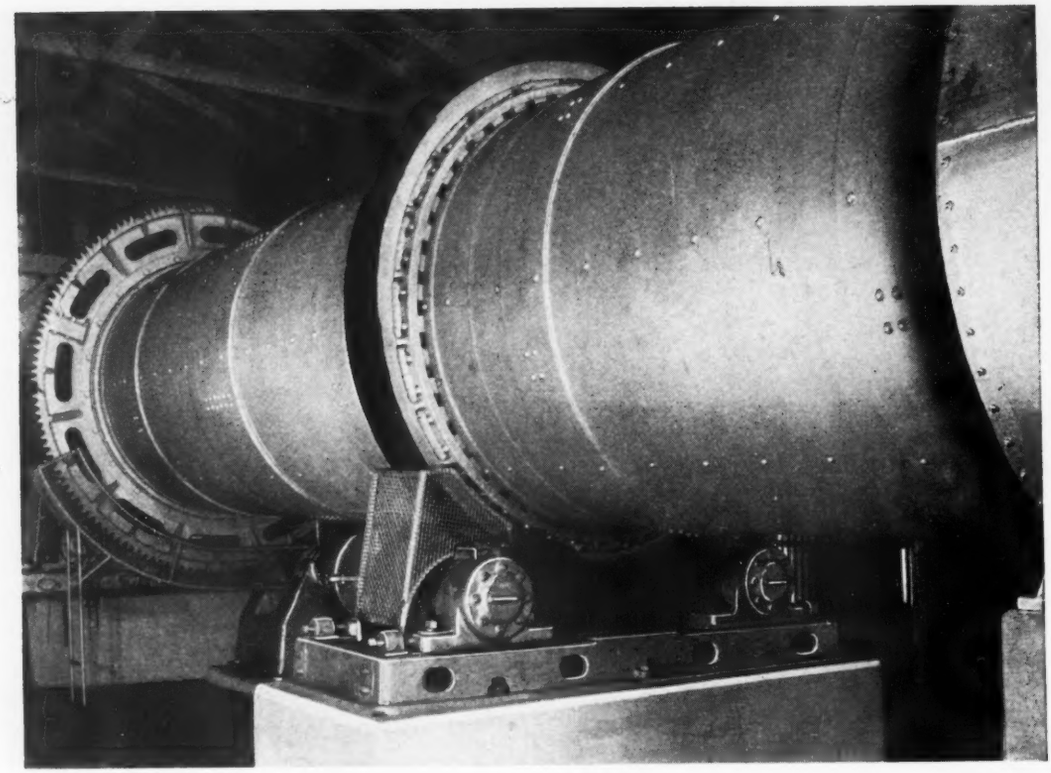
**Full-size, 12″ x 18″, Charts are available covering prominent makes of underground machinery. Order by *make and model* today, using Company letterhead, please.**




TEXACO LUBRICANTS


Record
TEXACO MAINTENANCE LUBRICATION CHART
JEFFREY UNIVERSAL COAL CUTTING MACHINE
CLASS 29-U
AXLE JOURNALS (4-PLACES) TEXACO STARFAK M ONCE PER SHIFT.
TURNTABLE BEARING (3) TEXACO STARFAK M ONCE EVERY 3 WEEKS
HOSE REEL TEXACO STARFAK M ONCE PER SHIFT.
CUTTING MOTOR TEXACO STARFAK M ONCE PER WEEK.
HYDRAULIC CYLINDER PINS AND CUTTER BAR SUPPORT TEXACO STARFAK M — ONCE PER SHIFT.
SEAL BEARING - TEXACO STARFAK M THREE TIMES PER SHIFT.
CUTTER CHAIN - TEXACO SUMMER BLACK OIL OILED AT END OF EACH CUT.
OIL GAUGE
CUTTING MOTOR TEXACO STARFAK M ONCE PER WEEK.
MAIN GEAR BOX - TEXACO MARFAK NO.0 KEEP LUB. ONE & ONE HALF INCHES DEEP IN BOX WHEN IT IS HORIZONTAL. EXAMINE EVERY TWO WEEKS.
HEAD TURNOVER WORM TOP BRG - APPLY A SMALL QUANTITY OF TEXACO STARFAK M — EVERY TWO WEEKS.
SPROCKET SHAFT - TEXACO STARFAK M THREE TIMES EACH SHIFT.
HYDRAULIC CYLINDER PINS AND CUTTER BAR SUPPORT TEXACO STARFAK M — ONCE PER SHIFT.
OIL NO.30
LLED WITH SAME OIL, TO MARK ON GAUGE.
ERATION, WASH WITH STRAIGHT GASOLINE,
COMPRESSED AIR, AND DRY BEFORE REPLACING.
HOULD BE CLEAN, TO FUNCTION PROPERLY.
ANNUALLY - DRY THOROUGHLY.
C SYSTEM, WHICH WOULD BE DETRIMENTAL TO
KING.
NOTE: REMOVE COVERS ON CAB ONCE EACH WEEK AND APPLY TEXACO CRATER NO.1 - TO ALL GEAR TEETH.
PIVOTS - TEXACO STARFAK M — ONCE PER SHIFT.
STING IDLER- — ONCE PER SHIFT
EXAMINE EVERY 2 MONTHS & LUB WITH TEXACO STARFAK M — IF NEEDED. DO NOT REMOVE PIPE PLUG. AS IT IS NOT A LUBRICATING FITTING.
HYDRAULIC CYLINDER PINS AND CUTTER BAR SUPPORT. TEXACO STARFAK M — ONCE PER SHIFT.
WORM - TEXACO STARFAK M — ONCE PER SHIFT.
HEAD GEAR BOX. TEXACO MARFAK NO.0 KEEP LUB. LEVEL ABOUT ONE HALF INCH BELOW FILLING PIPE WHEN HEAD IS IN POSITION SHOWN. EXAMINE EVERY TWO WEEKS.
TEXACO CUP GREASE NO.2
ACK SLIDES TEXACO STARFAK M NCE PER SHIFT.
APPLY ONE GREASE GUN OF TEXACO STARFAK M EVERY TWO WEEKS.
PINS (TWO) - TEXACO STARFAK M ONCE PER SHIFT.
TIMKEN BEARING (OPPOSITE SIDE) TEXACO STARFAK M — TWICE PER SHIFT.
TIMKEN BEARING TEXACO STARFAK M TWICE PER SHIFT.
For the Coal Mining Industry



# Do you have a Drying Problem?

Over 225 **"Ruggles-Coles"** Rotary Dryers have been installed for drying Anthracite — Bituminous — Culm — Lignite and River Coal.

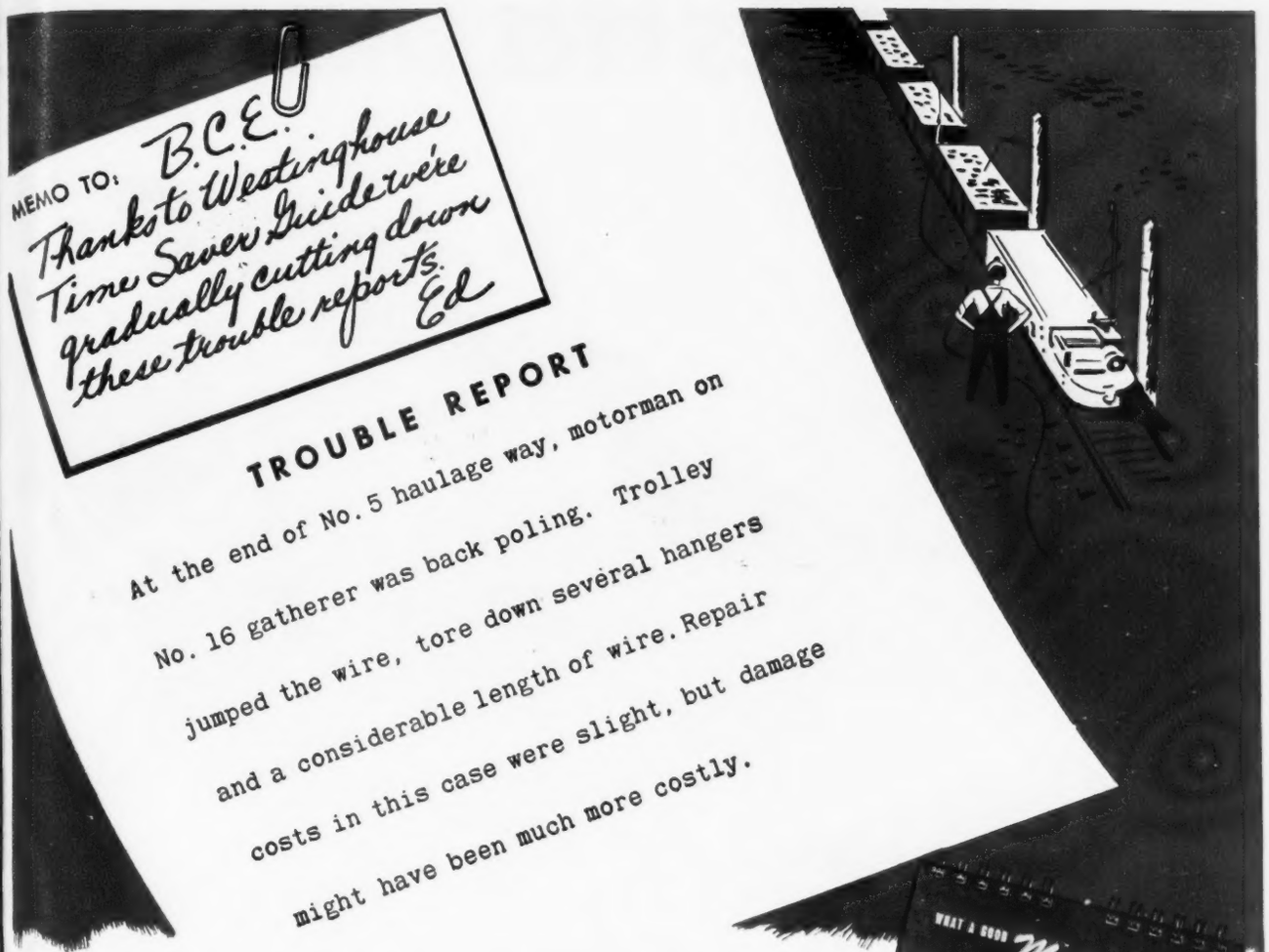
The class "XA" Double Shell Dryer has highest thermal efficiency of all Rotary Dryers, low maintenance and operating cost.

*Write for Bulletin 16-C*

**HARDINGE**

**COMPANY, INCORPORATED - YORK, PENNSYLVANIA**

New York, 122 East 42nd Street Chicago, 205 West Wacker Drive San Francisco, 501 Howard Street Toronto, 200 Bay Street


MEMO TO: B.C.E.
Thanks to Westinghouse Time Saver Guide we're gradually cutting down these trouble reports.
Ed
TROUBLE REPORT
At the end of No. 5 haulage way, motorman on No. 16 gatherer was back poling. Trolley jumped the wire, tore down several hangers and a considerable length of wire. Repair costs in this case were slight, but damage might have been much more costly.

# PROPER INSTRUCTION →

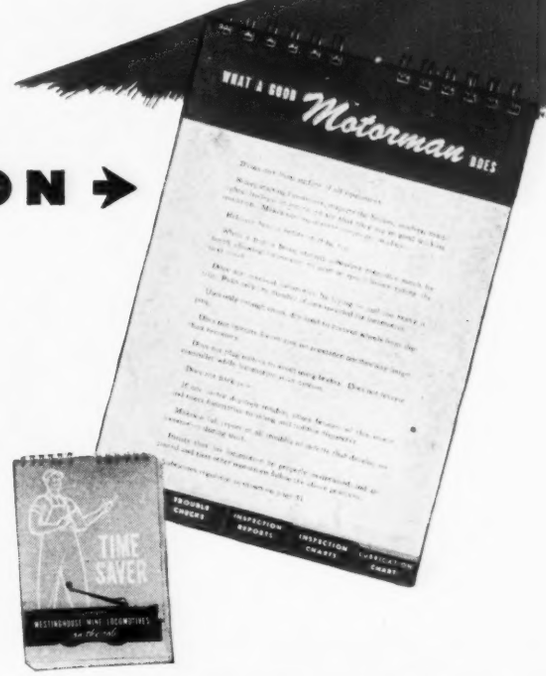
## Could Prevent Such Delays

In these times when higher tonnage, low maintenance and safety are so vital, these results can best be obtained by properly instructing the men most closely associated with actual production—locomotive motormen.

In their conscientious effort to produce maximum tonnage, they may forget or overlook some of the fundamental rules which will help them obtain greater tonnage with available equipment.

This section in the Westinghouse Time Saver—"What a Good Motorman Does"—lists a few simple rules which motormen should follow, but sometimes neglect.

A copy of the Time Saver should be placed with each motorman now. It will pay dividends, not only in increased tonnage and time saved, but in greater personal pride on the part of your operating men. J-15086




"What a Good Motorman Does" is a brief refresher on proper operating procedure. It is typical of the practical material contained in the Westinghouse Time Saver Guide. WRITE TODAY to Dept. 7-N for copies of this book for your men. Ask for Booklet B-3150.

**Westinghouse**

PLANTS IN 25 CITIES... OFFICES EVERYWHERE

**MINE LOCOMOTIVES**

# WHEN OUNCES FEEL LIKE POUNDS...

*Reg. U. S. Pat. Office

1230 SIXTH AVENUE
ROCKEFELLER CENTER, NEW YORK 20

UNITED ST

# ...ASSAULT TROOPS USE LAYTEX*

You know how it is. You slog along all day under full equipment. At first you don't mind the weight very much. But as the hours crawl along, everything you're toting gets heavier and heavier. The canteen you didn't notice in the early stages now weighs as much as your rifle did then. And your rifle feels like a howitzer. Every ounce turns into a pound.

That's why . . . when you're moving fast and the going is tough . . . it's smart to use Laytex Assault Wire.

*A full mile of Laytex Assault Wire weighs less than 30 pounds.*

Laytex Assault Wire has a breaking strength of 50 pounds per conductor and a talking distance of more than 5 miles.

Laytex resists concussion and a wide range of temperature changes.

It is flexible and waterproof, strong and tough.

Conductors are accurately centered and the weight of insulation and the diameter of the insulated conductor are kept at the minimum.

All this adds up to the fact that one man, wearing a breast reel of Laytex Assault Wire can move swiftly and easily. One man can maintain sure communication with operational headquarters.

*Listen to the Philharmonic Symphony program over the CBS network Sunday afternoon, 3:00 to 4:30 E.W.T. Carl Van Doren and a guest star present an interlude of historical significance.*

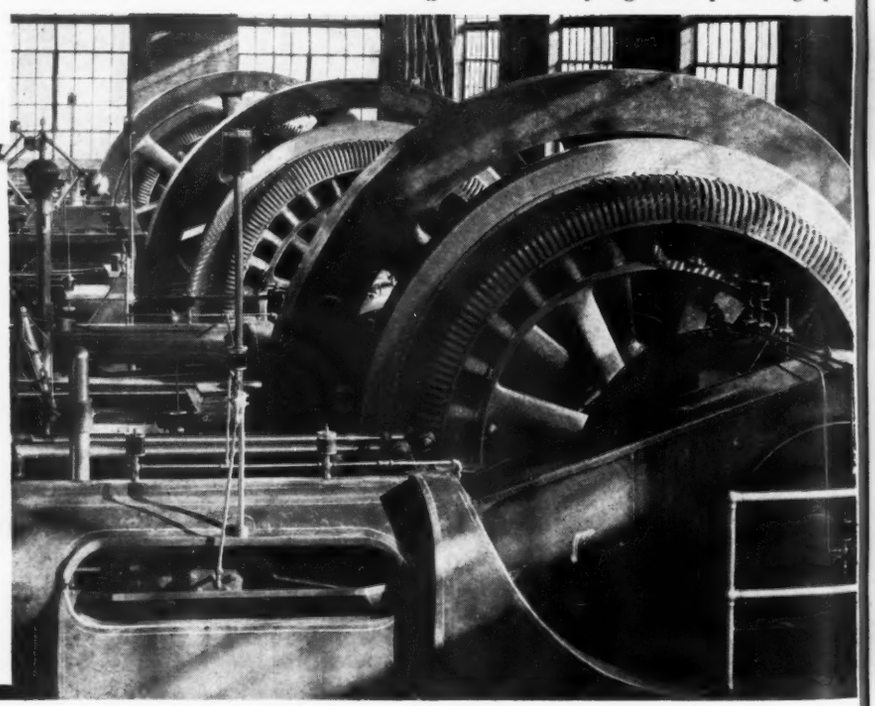
# ED STATES RUBBER COMPANY

*Official U. S. Army Signal Corps Photograph*

**POWER TO ATTACK** relies on *power production.* For stepped-up output from *STEAM* engines use . . .

**. . . SINCLAIR STEAM CYLINDER and VALVE OILS.** These oils meet wet, dry, or superheated steam requirements . . . suit all engine designs and operating characteristics . . . provide *safe* lubrication under continuous full loads or emergency overloads.

*(Write for "The Service Factor"—published periodically and devoted to the solution of lubricating problems.)*



# SINCLAIR INDUSTRIAL OILS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY (INC.), 630 FIFTH AVENUE, NEW YORK 20, N. Y.

# GLOGORA PUTS 200 NEW TIMKEN BEARING EQUIPPED CARS IN SERVICE

*A trip of the new mine cars at Red Dragon Mine equipped with Timken Bearings.*

Haulage at the Glogora Coal Company's mine, Red Dragon, W. Va., has been speeded up considerably by the addition of these new, large cars placed in operation this year. The cars are modern in the extreme, having four axles, four wheel brakes and double action spring bumpers. They are 14′4½″ long, 6′9½″ wide and 41″ high and regularly bring out from 6 to 8 tons of coal each. They were built by American Car & Foundry Company, Huntington, W. Va.

Timken Bearing Equipped mine cars are helping coal operators to meet wartime demands by permitting longer trips of loaded cars to be hauled from mines to tipples and empties returned faster. Furthermore, there is less idle car time due to lubrication and maintenance; cars spend more time on the job — less in the repair shop.

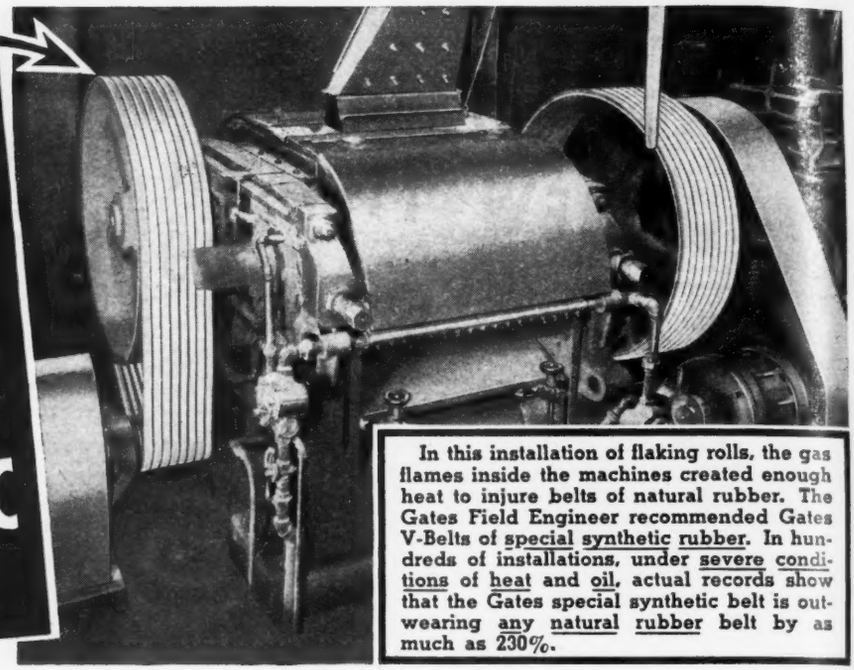
Hundreds of thousands of mine cars equipped with Timken Tapered Roller Bearings have gone into operation during the last 23 years. Many of the oldest of them still are in service and going strong. More than a thousand users have proved it pays to operate Timken Bearing Equipped mine cars. The Timken Roller Bearing Company, Canton, Ohio.

**TIMKEN**
TRADE MARK REG. U. S. PAT. OFF.
**TAPERED ROLLER BEARINGS**

**To mine equipment manufacturers: Don't wait to see what will happen after-Victory; redesign now, using more Timken Bearings. Then you'll be ready for anything.**

Here The Gates Field Engineer Recommended

# GATES BELTS of Special SYNTHETIC RUBBER



In this installation of flaking rolls, the gas flames inside the machines created enough heat to injure belts of natural rubber. The Gates Field Engineer recommended Gates V-Belts of special synthetic rubber. In hundreds of installations, under severe conditions of heat and oil, actual records show that the Gates special synthetic belt is outwearing any natural rubber belt by as much as 230%.

## He Can Tell You Whether You Need . . . .

**❶ Synthetic Rubber V-Belts**

**❷ Steel Cable V-Belts**

**❸ Cotton Cord V-Belts**

**❹ Static-Safety V-Belts**

**❺ Rayon Cord V-Belts**

Whenever a drive in your plant appears to be wearing belts out faster than it should—just pick up your phone and call the Gates Field Engineer.

He is a specialist in drive operation and he can quickly diagnose any trouble you are having. In most cases he can correct that trouble very easily and without recourse to using V-Belts of special structure.

There are, however, countless drives where V-Belts having special characteristics will prove to be the most efficient and economical that you can use.

**The flaking rolls, pictured above, are a case in point. For more than five years now, Gates has been making special synthetic V-Belts—and the records in hundreds of applications show that, under severe conditions of heat and oil, these special synthetic belts are wearing 2 times to 2½ times as long as any belt of natural rubber.**

There are other types of drives on which V-Belts with load-carrying members composed of flexible steel cables — or of rayon cords — will prove to be the most desirable application. Again, a Static-Safety V-Belt may best fit your special needs.

In any case, the wisest move you can make is to phone your Gates Field Engineer. Your telephone directory will give you his number. He will put all of his specialized knowledge and experience at your disposal—and he will always recommend the practice that will be most efficient and economical for you.

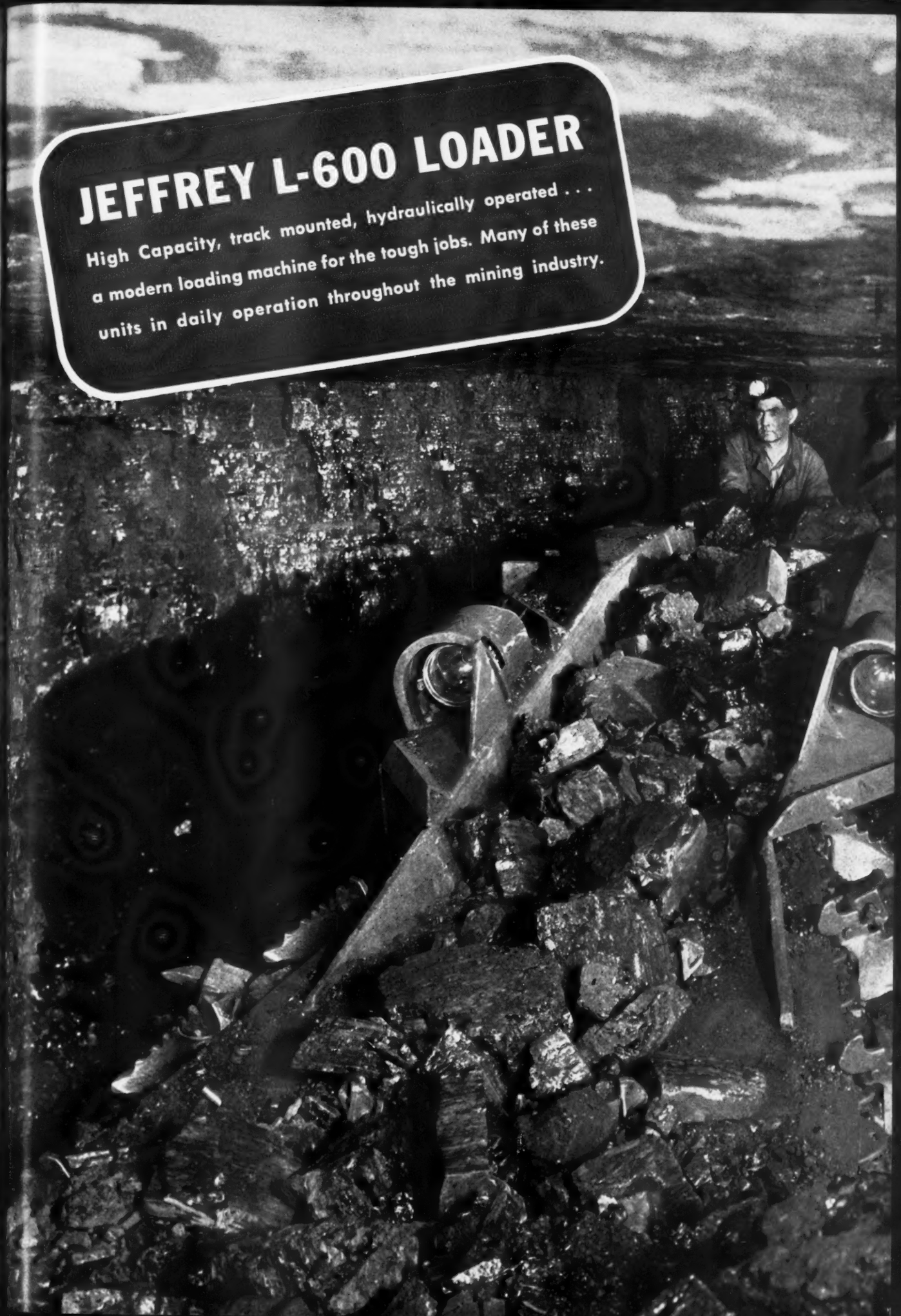
4312.

THE GATES RUBBER COMPANY

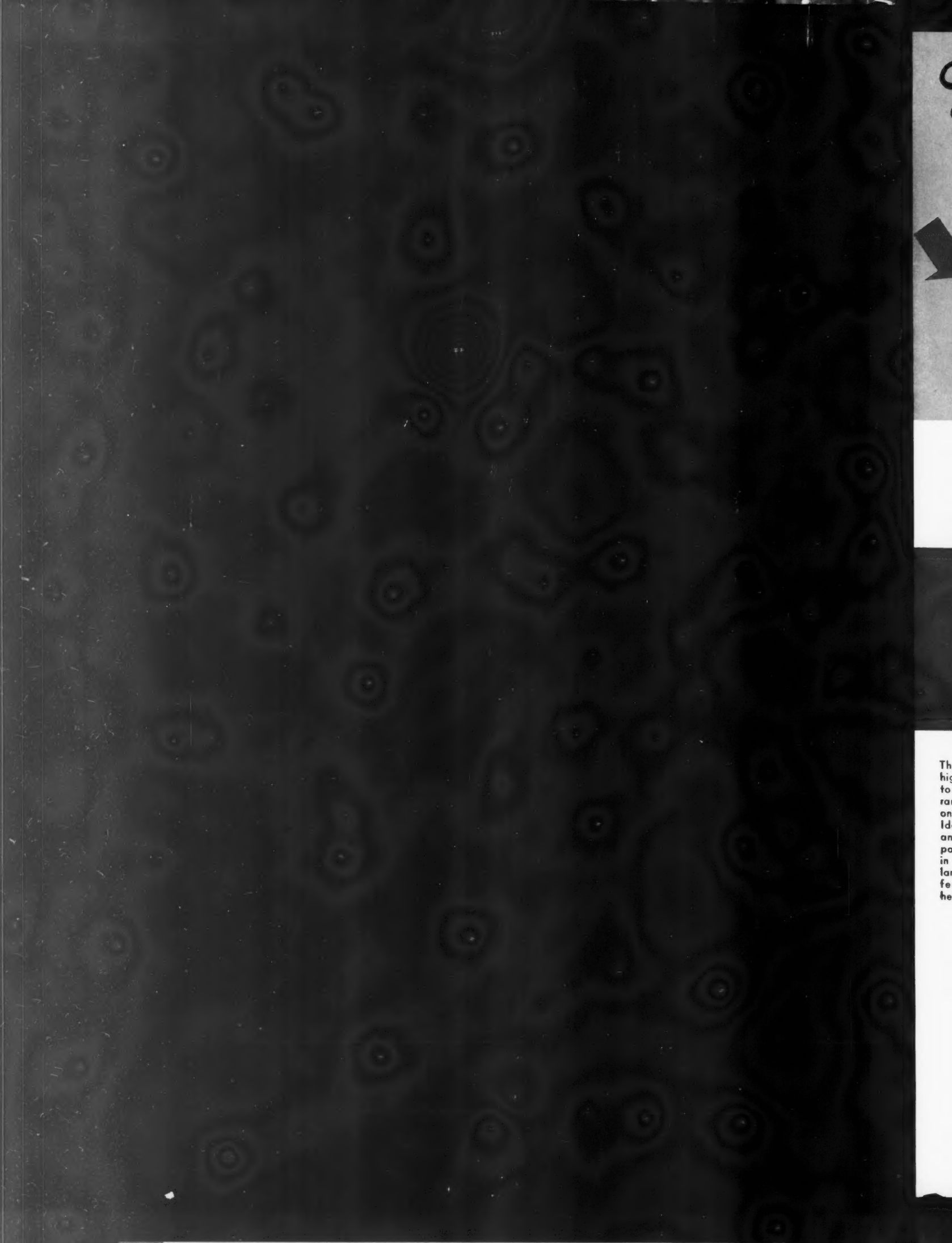
*Engineering Offices and Stocks in All Large Industrial Centers*

**GATES VULCO ROPE DRIVES**

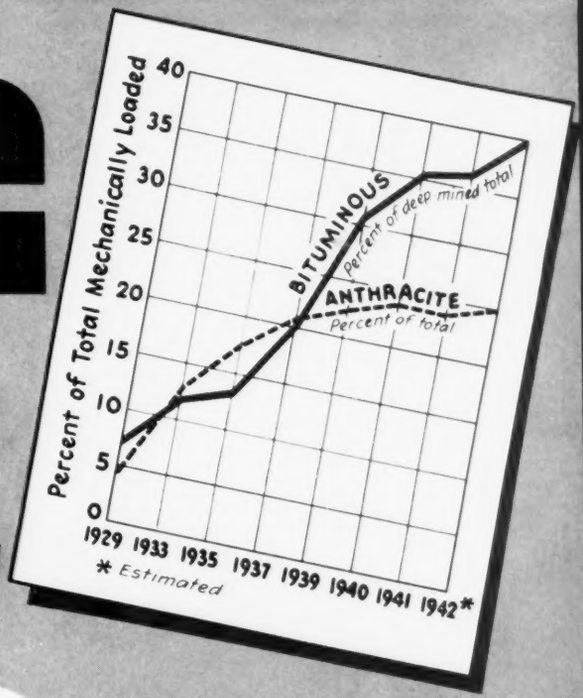
**CHICAGO, ILL.** 549 West Washington
**NEW YORK CITY** 215-219 Fourth Avenue
**ATLANTA, GA.** 738 C & S National Bank Building
**LOS ANGELES, CAL.** 2240 East Washington Boulevard
**DENVER, COLO.** 999 South Broadway
**DALLAS, TEXAS** 2213 Griffin Street
**PORTLAND, ORE.** 333 N. W. 5th Avenue
**SAN FRANCISCO, CAL.** 1090 Bryant Street


JEFFREY L-600 LOADER
High Capacity, track mounted, hydraulically operated . . . a modern loading machine for the tough jobs. Many of these units in daily operation throughout the mining industry.

151-42



# The SWING to MECHANICAL MINING



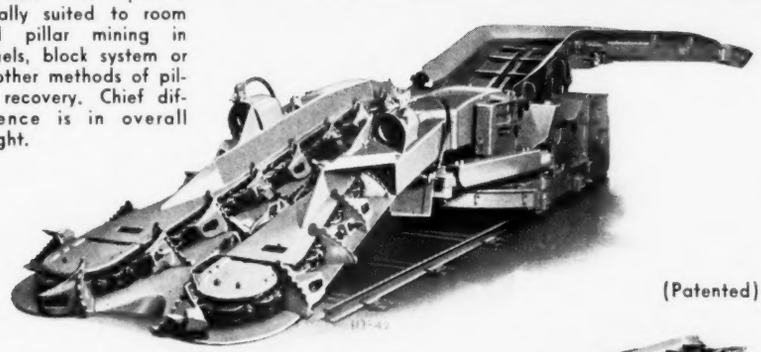

**40% (232,000,000 TONS) OF BITUMINOUS AND 25% (15,000,000 TONS) OF ANTHRACITE WERE**

**MECHANICALLY MINED IN 1942**

**FOR INCREASED PRODUCTION AND ECONOMICAL OPERATION NOW AND FOR POST-WAR CONDITIONS—**

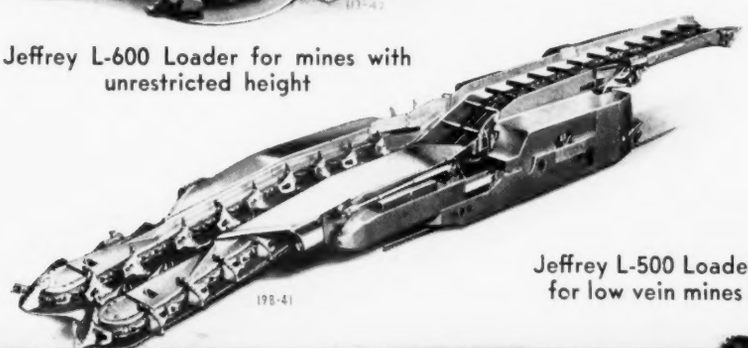
# JEFFREY LOADERS

These machines offer high capacity loading to all mines with seams ranging from three and one-half feet upward. Ideally suited to room and pillar mining in panels, block system or in other methods of pillar recovery. Chief difference is in overall height.



(Patented)

Jeffrey L-600 Loader for mines with unrestricted height



Jeffrey L-500 Loader for low vein mines

**60 THOUSAND TONS OF COAL REQUIRED TO MAKE STEEL FOR ONE BATTLESHIP**

**BUY WAR BONDS**

# Jeffrey

## SERVES THE INDUSTRY
## BELOW AND ABOVE GROUND
## FROM FACE TO RAILROAD CAR

**CUTTERS**
**DRILLS**
**LOADERS**
**LOCOMOTIVES**
**FANS**
**CONVEYORS**
**BLOWERS**
**JIGS**
**CRUSHERS**
**SCREENS**
**RENEWAL PARTS**

## THE JEFFREY MANUFACTURING COMPANY

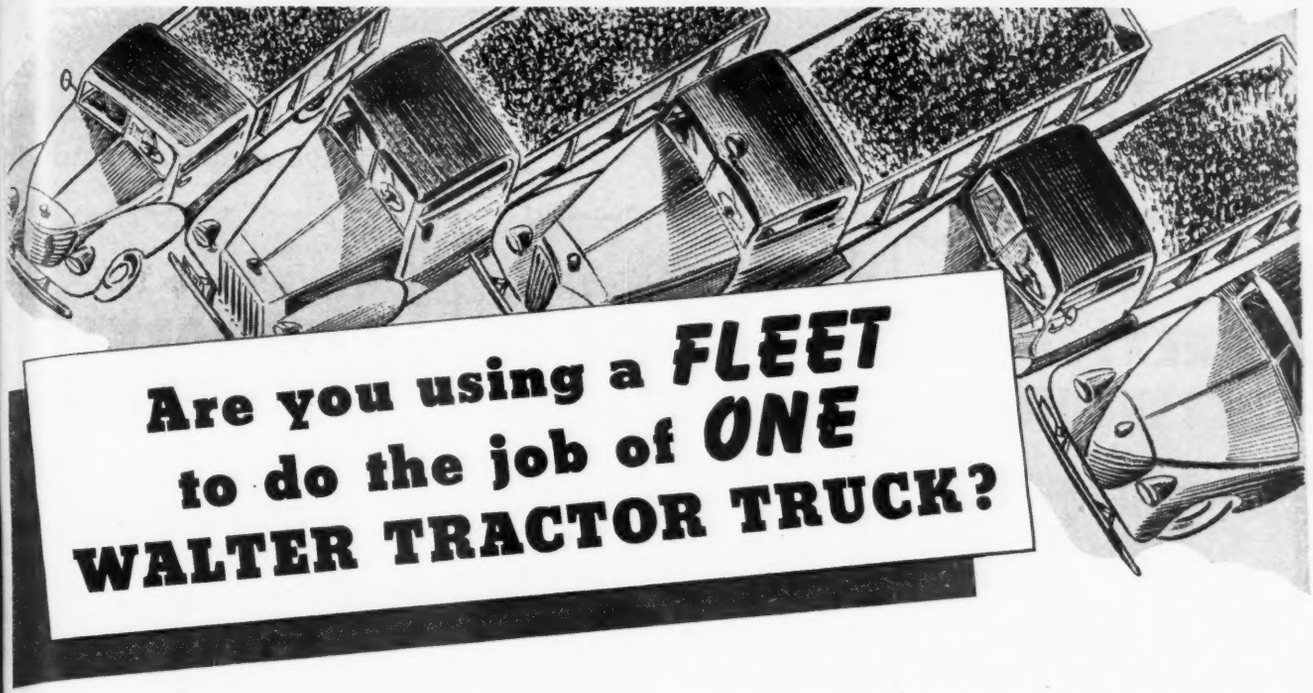
*Established in 1877*

912-99 NORTH FOURTH STREET, COLUMBUS 16, OHIO

**Sales Offices:** Baltimore, Birmingham, Boston, Buffalo, Chicago, Cleveland, Cincinnati, Detroit, Denver, Harlan, Houston, Huntington, Milwaukee, New York, Philadelphia, Pittsburgh, Scranton, St. Louis, Salt Lake City

**Service Stations:** Pittsburgh, Harlan, Ky., Birmingham, St. Louis, Logan-Beckley, W. Va., Scranton

**Foreign Plants:** Jeffrey Mfg. Co., Ltd., British Jeffrey-Diamond, Ltd., Jeffrey-Galion (Pty), Ltd.



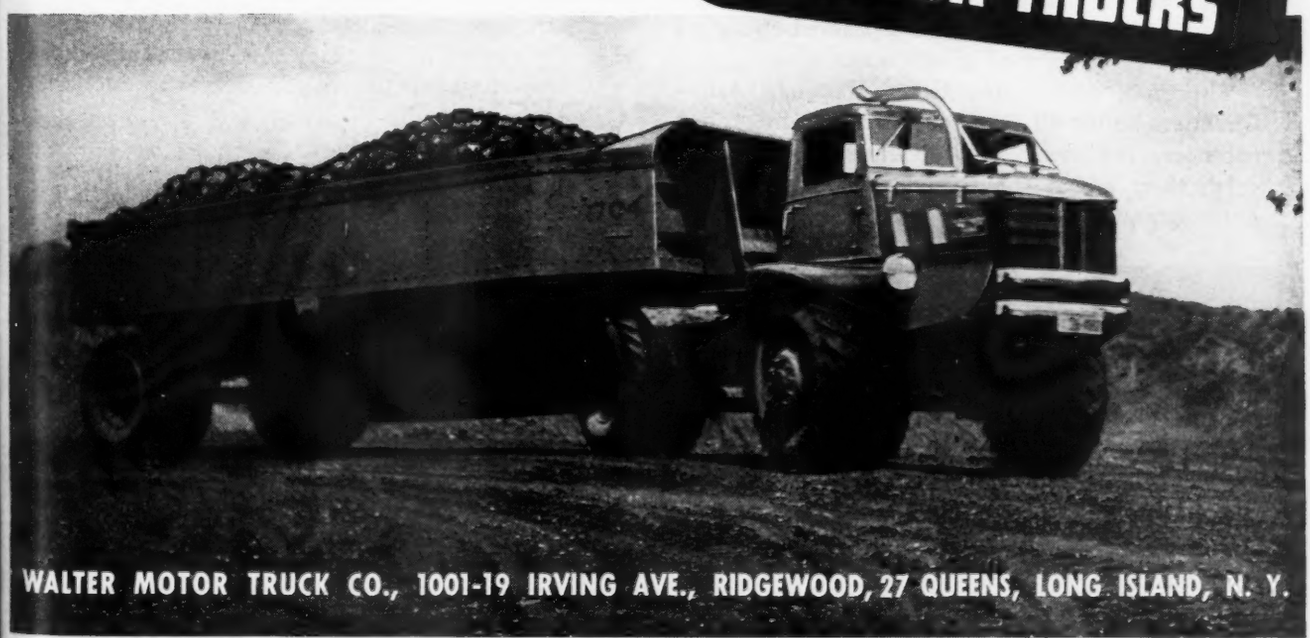
# Are you using a FLEET to do the job of ONE WALTER TRACTOR TRUCK?

WHEN a single Walter Tractor Truck hauls twenty-five to fifty ton pay loads in one quick trip—why use a fleet of smaller trucks to deliver this tonnage? Especially today, when extra trucks mean extra drivers and added maintenance.

But hauling big payloads fast is only part of the Walter Tractor Truck story. They put more hauling days on your calendar—the days when other trucks are stopped by mud, snow and slippery surfaces. For only Walter Tractor Trucks have the 100% traction of the exclusive Walter Four-Point Positive Drive. Wheel slippage is prevented by three patented Automatic Locking Differentials that proportion the power to the FOUR Driving Wheels according to the traction of each wheel at any instant.

Other features of Walter Tractor Trucks are: Six forward and two reverse speeds, selected by a single gear lever in the Tractor Type Transmission. Suspended Double Reduction Drive for better road contact, higher ground clearance and larger gear capacity. Short wheelbase and scientifically distributed weight make maneuvering at pit and tipple easier and faster. Write for literature describing these and other features of Walter Tractor Trucks.

**WALTER TRACTOR TRUCKS**



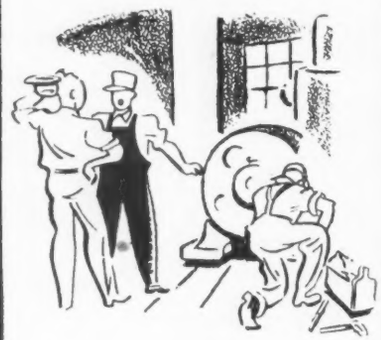
WALTER MOTOR TRUCK CO., 1001-19 IRVING AVE., RIDGEWOOD, 27 QUEENS, LONG ISLAND, N. Y.

# Help Wanted?

You can lean on Allis-Chalmers Cooperative Engineering—*hard* — to help beat production problems facing every operator now!

*. . . to Help Lick*

## UNEXPECTED BREAKDOWNS?



**How many of your key machines were built for 24-hour-day service?**

*. . . to Help Lick*

## LABOR SHORTAGE?

**Do you use any men unnecessarily? Processing is a *machine* industry!**

*. . . to Help Lick*

## OVERWORKED ENGINEERS?

**Outside engineering cooperation might solve many problems quickly.**

## *WHATEVER HELP YOU WANT* — CALL ON ALLIS-CHALMERS!

FRANKLY, MR. COAL OPERATOR, we don't claim to know everything about your business. But the fact is that our Cooperative Engineering Service is helping hard-pressed operators straighten out a lot of tough kinks.

There's a reason for this: Because Allis-Chalmers builds *all* types of basic equipment, our engineers are *complete line* engineers.

It's their job to know ways to help you make *existing* equipment work together more efficiently ... give you better "machine teamwork."

And if you *do* need equipment, Allis-Chalmers engineers don't have to "push" *one* type!

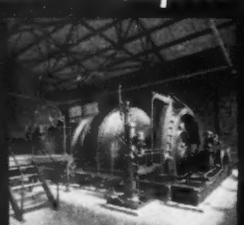
Learn how Allis-Chalmers Cooperative Engineering (yours at *no* cost) can "team up" with your own engineers to give you greater production. Call our nearby district office. Or write ALLIS-CHALMERS, MILWAUKEE, WIS.

A 1623-A

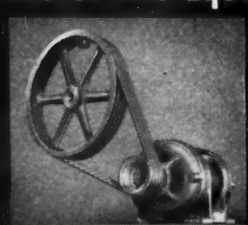
## Only Allis-Chalmers Makes a *Complete* Line of this Equipment . . .

VIBRATING SCREENS — Efficient separation and dewatering—8 different types.

CENTRIFUGAL PUMPS — Largest line, highest efficiencies—built with motors.



MINE HOISTS — Completely automatic control with new "Regulex" exciter.



MOTORS & DRIVES — Top team — Lo-Maintenance Motor & Texrope V-belts.

RECTIFIERS — Low-loss conversion of a-c into versatile d-c current.

# "What's Your Problem?"

## says *Romey

### "Our Representatives Are Still on the Job"

"Rome Cable representatives are still on the job. A call from you will bring one of these men to help you keep up-to-date on directives which regulate the coal industry's use of cable.

"Our boys know your problems. They live with them just like you do.

"It is this first hand information that has enabled us to put into Rome 60-38 cables the stuff that has made them famous for resistance to wear and moisture."

*Copr. 1943 RCC

FROM BAR TO FINISHED WIRE

# ROME CABLE CORPORATION

ROME • NEW YORK

# In th

C. & C. COAL COMPANY

MINERS OF NUGYM COAL

SHIPPING POINT, NUGYM, BELL CO. KY.
P. O. PINEVILLE, KY.

November 2, 1943

Sanford-Day Iron Works, Inc.,
Knoxville, Tenn.

Gentlemen:

In 1940 we installed your latest type S-D Automatic Mine Cars in our mine and it has occured to us that you would like to know how we are getting along with these cars.

You will recall that back in 1918, my father, E. Guthrie, started installing S-D "Automatics" in his Harlan Fuel Company mine at Yancey, Kentucky, and soon had close to 800 of them in use. After these cars had served him for about 22 years, having hauled between 10,000,000 and 15,000,000 tons of coal, they were replaced with 400 later design S-D "Automatics" in 1940.

You know, also, it was the production and cost records and proved performance of these cars, which we knew of first hand, that made us realize S-D Automatic mine cars were the only cars for my brother and me to install in our new C & C Coal Company mine at Pineville, Kentucky.

We could give you our production cost figures, but believe that it is sufficient to say we are more than satisfied with the performance of these cars, and if we were opening another mine, cars would be S-D "Automatics". They would have to be, we honestly believe, to hold our production to our present high mark, and costs at our present low. Incidentally, we attribute much of our success to the simple fact that our men prefer these cars because they are so easily and quickly maneuvered for loading, and consequently more time and energy are devoted to loading cars.

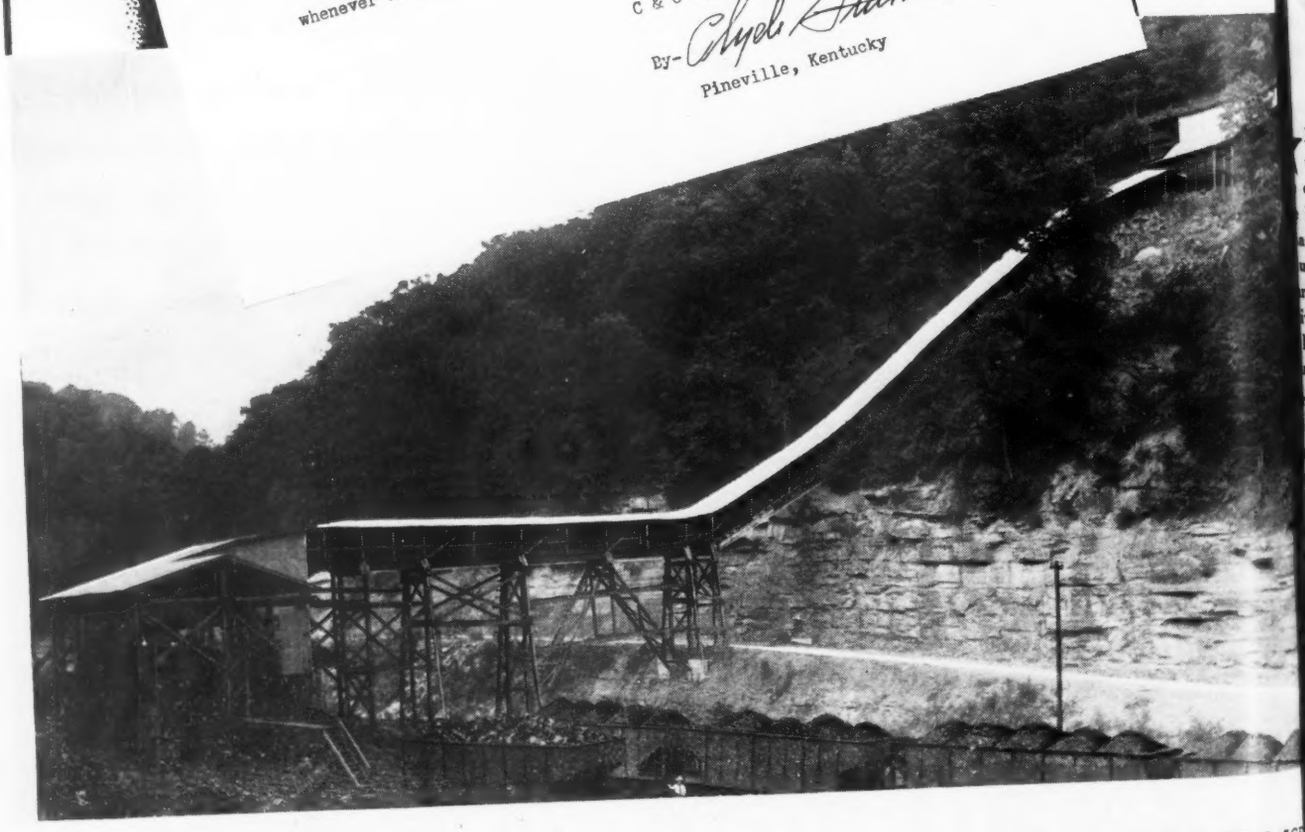
You may rest assured that we recommend S-D "Automatic" cars whenever we have the opportunity.

Yours very truly,

C & C COAL COMPANY

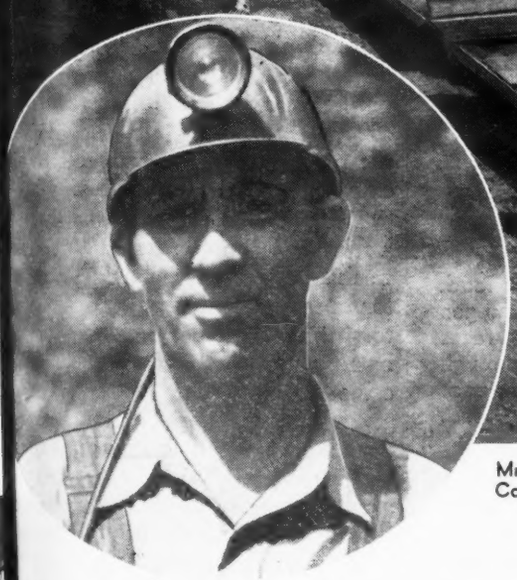
By- Clyde Guthrie

Pineville, Kentucky



C & C Co
excellent sc
plant and co
to bin layout.

# OOTSTEPS of EXPERIENCE -



Mr. Edwin Dozier, Gen. Supt., C & C Coal Co.

A trip of S-D "Automatics" coming in, pass a trip of empties going back to mine.

Here is another in a series of case histories of how wide awake operators are profiting from the experi- of others in mines where S-D Automatic mine cars been proved, unquestionably, to be the greatest aid aximum production, at the lowest cost per ton of coal uced, the industry has ever known. Mr. Clyde rie's comments, in his letter on the opposite page, ve to results obtained from S-D "Automatics" are kind you, too, will make once you install these rkable cars.

. Edwin Dozier, Gen. Supt. of C & C Coal Co., says: used them all—every type of car in my 25 years ining—and I'm convinced that no other car can are with S-D 'Automatics' in performance. For ple, S-D 'Automatics' make it possible for us to te our night shift, filling our storage bin level full, ut running our screening plant. We save cars be- no standing idle trip is necessary. We bring a trip to 35 loaded cars in, with an average load of 3 tons r—incidentally, on cars of 1¾ ton level capacity—and the coal is weighed, discharged into bin, doors are closed, and cars are on their way back to mine, all in less than 5 minutes." Mr. Dozier states further: "Our motors push a train of S-D 'Automatics' just as easy as they pull them, and we seldom have a derailment. Our men like this."

All cars at C & C Coal Co. are equipped with S-D Special Closed Hub Type Timken Bearing Wheels, and no wheels have been greased more than once since the cars were installed. This means real savings on grease and labor.

Messrs. Clyde and Charles Guthrie, operators of C & C Coal Co., are experienced and successful mining men. They have been brought up in mining, and their recommendation of S-D "Automatics" is worth your serious consideration.

Investigate S-D "Automatics" now . . . follow in the footsteps of experienced operators and you, too, will profit by it.

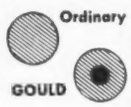
**Sanford-Day Iron Works, KNOXVILLE, TENNESSEE**

# GOULD keeps the ball rolling FOR LONGER BATTERY LIFE

Rated conservatively . . . Goulds equal or exceed in capacity any battery of comparable size and cell structure.

*Are you receiving the monthly informative "Gould Battery News"? If not . . . ask for it.*

● These are balls of chemically pure lead. Gould exposes them to the action of oxygen in special rotary mills, where their surfaces change to a black lead oxide. Then, through abrasive action, this oxide breaks off . . . each particle carrying with it a core of pure lead.




That pure lead core is important. Ordinary battery oxide is completely oxidized when set in the plate, but not Gould's Black Oxide. As the normal charging and discharging operations of a Gould Kathanode wear away the outer surface of the black oxide particles, their pure lead cores are converted into new active material . . . a regenerative quality not found in ordinary active material. This results in Gould Kathanode maintaining high sustained capacity throughout a longer battery life.

Get the facts on Gould Batteries. Ask for Gould Kathanode Bulletin, using letterhead.

**GOULD STORAGE BATTERY CORPORATION**
DEPEW, N.Y. • Factories at Depew, N. Y. • North Bergen, N. J. • Dallas
Atlanta • Chicago • Saint Paul • Leavenworth • Los Angeles

*FOR EXCELLENCE IN STORAGE BATTERY PRODUCTION AT DEPEW PLANT*

GOULD

*Since 1898* THE BATTERY PICKED BY ENGINEERS


## EQUALIZING CHARGES

*One of a series of service suggestions for users of industrial batteries.*

▶ The individual cells of any industrial storage battery tend to operate at varying rates of discharge. This is caused by changed operating conditions and differing internal characteristics within each cell. Such variations are cumulative and, as charge and discharge cycles are repeated, will cause some cells to operate almost constantly in a state of discharge. This is not only harmful to such cells, but if the condition is allowed to continue for some time, reversal is sure to follow.

Reversal, as most users of industrial batteries have learned from bitter experience, seriously reduces the capacity of the battery, for the reversed cell, or cells, is consuming power rather than adding to the total output. More than that it damages the plates of the affected cell to the extent that the unit must be replaced.

The prevention of this condition is a relatively simple matter. Once each week a battery that is in constant use for operating industrial trucks, tractors, mine locomotives, or any other battery propelled vehicle, should receive an equalizing charge. This is given by continuing a "regular" charge from a normal end at a rate not to exceed the "finish" rate, and it may be somewhat lower. This charge is continued until all cells gas freely, and until three consecutive readings of specific gravity and cell voltage, taken at half-hourly intervals, show no further increase.

Batteries that are not in constant use do not require weekly equalizing charges but, even in these cases, they should receive this attention at regular intervals.

Another good battery practice is to keep a card record system showing the gravity and voltage readings of each cell at the end of the equalizing charge. If there is a progressive downward trend in the gravity readings it is usually a sign of trouble, such as sulfation or leakage, within the cell.

Stationary batteries also require periodic equalizing charges. This, however, is a more complicated procedure and difficult to describe in this limited space. Interested persons may receive full information by writing the Service Department, Gould Storage Battery Corporation, Depew, New York.

# Shovels Are Weapons, Too

## *Good Blasting S-t-r-e-t-c-h-e-s Their Life*

Increase production by getting more work out of your present stripping equipment. Make buckets stretch—as far as possible, and last as long as possible.

Good blasting is one of the most effective "bucket-stretchers" you can find. And, an important part of good blasting is—use the right explosive for your job. Examine, for example, the qualifications of

## ATLAS APEX

Low nitroglycerine, ammonium nitrate type of explosive with a heaving, spreading action. Adapted for use in either horizontal or vertical drill holes. Available in eight strengths—each strength in three velocities (low, medium, or high)—there are 24 combinations of speed and strength. One of these should provide just the right action for your formation.

Working synergistically* with explosives users, Atlas representatives have been able to help on many jobs. Perhaps they can make your equipment go further, too.

**APEX**

| GRADE | % Weight Strength | Velocity feet per second, in the open 1¼" x 8" | VELOCITIES 4½" x 16" CTGS. | | | Number of Cartridges per 50 lbs. 1¼" x 8" |
|---|---|---|---|---|---|---|
| | | | LOW | MEDIUM | HIGH | |
| A | 35 | 7000 | 10500 | 13000 | 19000 | 115 |
| B | 30 | 6900 | 9500 | 13000 | 19000 | 115 |
| C | 25 | 6500 | 9000 | 13000 | 19000 | 115 |
| D | 20 | 6500 | 9000 | 13000 | 19000 | 115 |
| 1 | 40 | 7200 | 10500 | 13000 | 19000 | 115 |
| 2 | 50 | 7300 | 10500 | 13000 | 19000 | 115 |
| 3 | 60 | 7500 | 10500 | 13000 | 19000 | 115 |
| 4 | 70 | 7800 | 10500 | 13000 | 19000 | 115 |
| Standard packing for Apex is | | 4" x 8¾ lbs.<br>5" x 25 lbs.<br>7" x 50 lbs. | 4" x 12½ lbs.<br>6" x 25 lbs.<br>7½" x 25 lbs. | 5" x 12½ lbs.<br>6" x 50 lbs.<br>7½" x 50 lbs. | 5" x 16⅔ lbs.<br>7" x 25 lbs.<br>8" x 50 lbs. | |

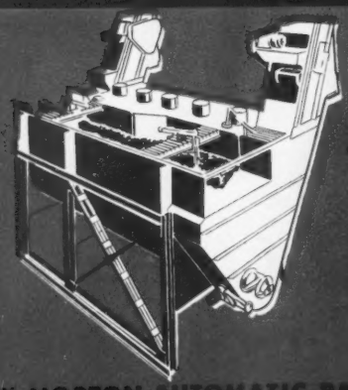
***Synergism**—*The meeting of minds "clicking together" from the impact of ideas to give a result greater than the sum total expressed—a "2 + 2 = 5" result. Synergism can be a big help toward making your equipment last longer.*

Apex: Reg. U. S. Pat. Off.

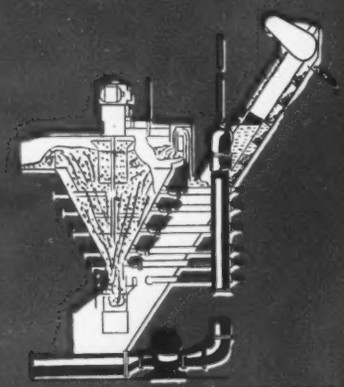
**ATLAS EXPLOSIVES**
*"Everything for Blasting"*

CHEMICALS ATLAS EXPLOSIVES

**ATLAS POWDER COMPANY, Wilmington 99, Del. • Offices in principal cities • Cable Address—Atpowco**



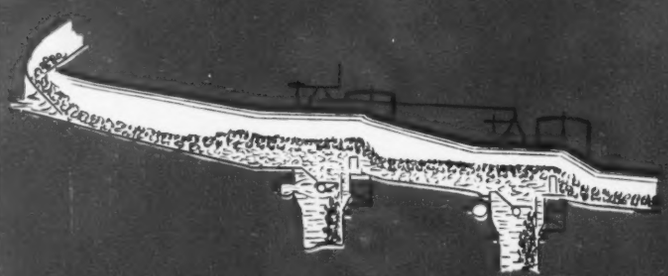
**McNALLY-NORTON AUTOMATIC PATENTED WASHER** of the Baum type, embodying these outstanding features: (1) positive separation of coal and refuse; (2) simplified, speedier fingertip operating control; (3) unobstructed accessibility for inspection and repairs; (4) greatly lowered cost and time out for maintenance. Write for Bulletin No. 441. It illustrates and describes the compound washer, nut washer, and standard 2 to 5 cell washer.



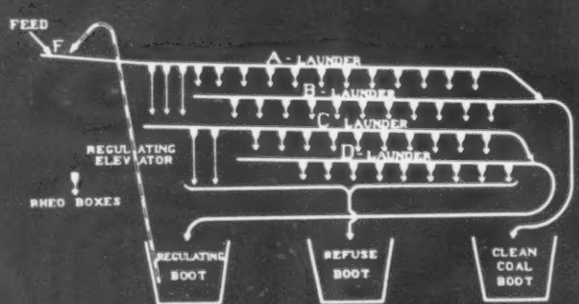
**McNALLY-MENZIES CONE SEPARATOR** utilizes the U-tube principle for automatic control of refuse. Upward water currents, introduced by a series of nozzles, keep the coal in suspension. Heavy refuse and middlings sink to the bottom, and pure coal is floated over a baffle. Write for Bulletin No. 142.

# When war

## ...AND YOU



**McNALLY-RHEO COARSE COAL LAUNDER.** Stratification occurs in an inclined trough equipped with Rheo boxes which control the removal of the heavier gravity fractions, refuse, and middlings. This system produces coal of uniformly high quality. Write for Bulletin No. 142.




**McNALLY-RHEO FINE COAL LAUNDER** washes progressively in a series of launders. Flowing stream of water stratifies impurities progressing from one launder to another, so that clean coal only flows from the lower end into clean coal boot. Write for Bulletin No. 142.

# ar emergency markets dry up

## OU HAVE TO DIG FOR ORDERS AS WELL AS COAL

A McNally Pittsburg equipped plant to prepare your coal is a life-saver for your sales department. With it you can furnish all the prepared sizes required by your customers. You get in the market and stay there, even when competitive fuels and prices will be available again to fuel users. Your operating department, too, benefits by the speed and efficiency with which your coal is crushed, sized, washed, dried, and delivered to railroad cars for shipment.

Write for bulletins or ask us to have our engineers consult with you and make recommendations for a preparation plant designed to meet the condition of your mine, the character of your coal, and the markets you serve.

**McNALLY PITTSBURG**

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

McNally Pittsburg Mfg. Corp.
Pittsburg, Kansas
307 N. Michigan Ave., Chicago 1, Ill.
Koppers Bldg., Pittsburgh 19, Pa.
Caixa Postal 1310, Rio de Janeiro, Brazil

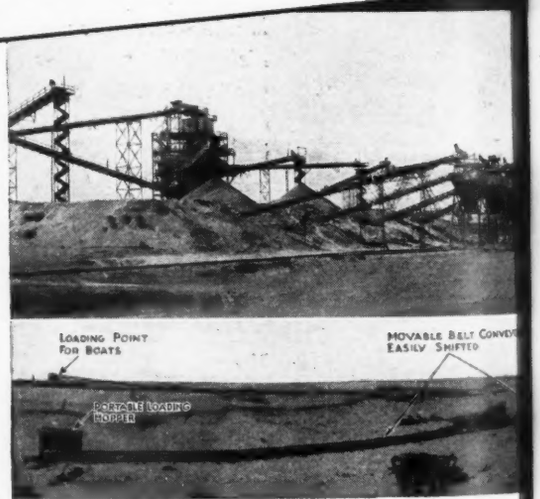
# AS TIME GOES BY...

## Designs Change . . . but S-A Quality Remains the Same

● Changing times bring changing needs. The need for new and better labor-saving, conveying methods is always present. We at Stephens-Adamson have always held it primarily important not only to stay abreast of new developments . . . but to anticipate and constantly plan for them.

Right now, this aspect of S-A activity has *double* significance . . . (1) the solution of your present problems . . . (2) the solution of new handling problems connected with new processes and products contemplated for the post-victory world.

**STEPHENS-ADAMSON MFG. CO., 2 Ridgeway Ave., Aurora, Ill.**




# STEPHENS-ADAMSON MFG. CO.

*Designers and Manufacturers of All Types of*

**BULK MATERIAL HANDLING EQUIPMENT**

# "PASS THE AMMUNITION"

# NATIONAL

An Industrial Ammunition

*Made in an*

AMERICAN PLANT

*with*

AMERICAN MATERIALS

*by*

AMERICAN WORKMAN

*for*

AMERICAN MINERS

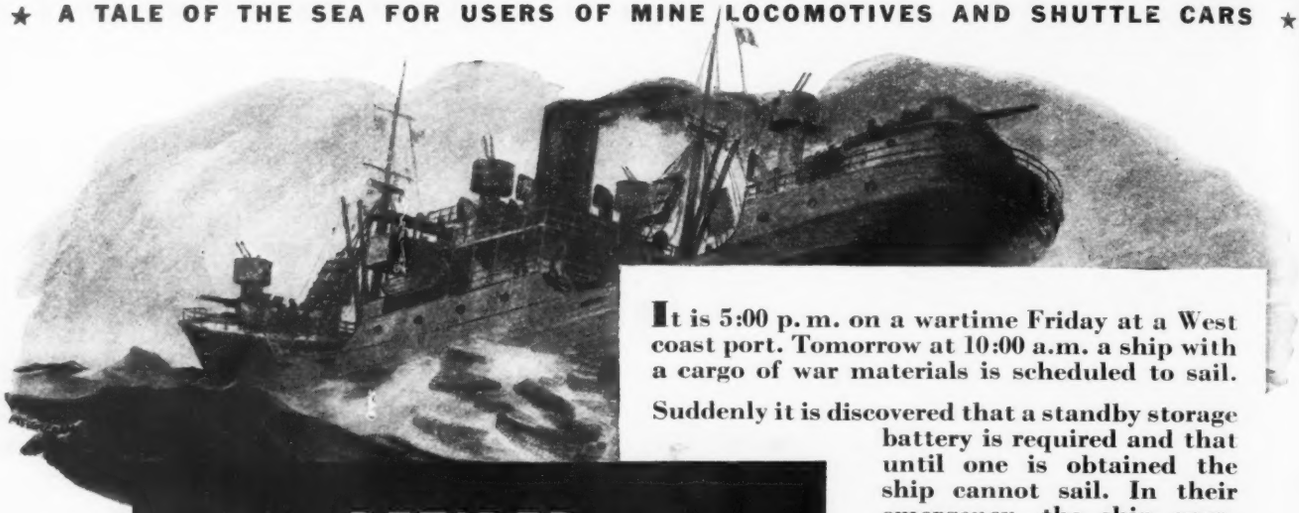
NOT LIVING ON OUR REPUTATION
BUT BUILDING IT

**NATIONAL POWDER COMPANY**

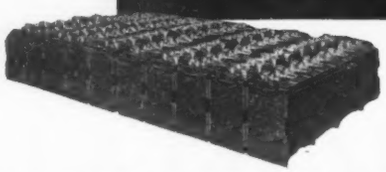
ELDRED (McKean County) PENNA.

*Manufacturers of High Explosives*
*for all Industrial Purposes*

★ A TALE OF THE SEA FOR USERS OF MINE LOCOMOTIVES AND SHUTTLE CARS ★



# HOW A RETIRED BATTERY SPED A SHIP TO WAR



It is 5:00 p. m. on a wartime Friday at a West coast port. Tomorrow at 10:00 a.m. a ship with a cargo of war materials is scheduled to sail.

Suddenly it is discovered that a standby storage battery is required and that until one is obtained the ship cannot sail. In their emergency, the ship operators phoned a local Edison engineer. Could a new alkaline battery be supplied from local stock? It could not. Then what could be done? "Perhaps," the Edison Engineer suggested, "our marine distributor could lend you a battery made up of used cells, until the new one can be shipped from our factory."

"See if they can," was the reply.

They could. They rounded up old but still serviceable cells; charged them during the night, and by 5:00 a.m. had assembled them into a battery and installed the battery on the ship. At 8:00 a.m. the official inspectors tested it and pronounced it satisfactory in every way. At 10:00 a.m. the ship sailed—on schedule. In normal times, this would not be considered good battery engineering. But that is not the moral of the narrative. The moral is that Edison Alkaline Batteries, even after they are old and perhaps no longer capable of delivering full rated capacity, nevertheless provide highly dependable service.

This quality, always available, is proving especially valuable in wartime . . . in the locomotives that are hauling coal and ore from the working places of American mines . . . in the industrial trucks that are handling materials in the war industries and the distribution depots of our armed forces . . . in the carlighting and signal systems of American railroads . . . in military uses where battery failure would be intolerable.

Some of the characteristics which account for this extra reserve of dependability in an Edison Alkaline Battery are cited in the column at left.

## ADVANTAGES OF THE EDISON ALKALINE BATTERY IN MINE LOCOMOTIVES AND SHUTTLE CARS

★ It is durable mechanically. High strength steel construction is used in the container, grids, pole pieces, etc. The electrolyte is a preservative of steel.

★ It is foolproof electrically. It may be short-circuited, over-charged, over-discharged, or even accidentally charged in the reverse direction without injury.

★ It can be charged rapidly. It may be charged at full normal rate throughout the entire length of charge. It requires no equalizing.

★ It withstands temperature extremes. It is not damaged by freezing. Free air spaces on all sides of all cells provide ventilation for rapid cooling under high temperature conditions.

★ It is free from ordinary battery troubles. It is not subject to sulphation, shedding of active material, buckling of plates, jar breakage or other common causes of battery failure.

★ It does not require critical adjustment of charge rates. It can be charged directly from the d-c mine power supply. It has no finish-rate limitations.

★ It is simple to maintain. Merely charge adequately, add pure water, keep clean and dry.

★ Its tray assembly and cell connections are extremely simple.

★ Its life is so long that its annual depreciation is less than that of any other type of storage battery.

EDISON STORAGE BATTERY DIVISION, THOMAS A. EDISON, INCORPORATED, WEST ORANGE, NEW JERSEY

Edison

ALKALINE BATTERIES

# Watch those Grooves

## ...if you want your wire rope to last

GROOVES that are too wide do not give proper side support, causing a flattened rope. If the grooves are too narrow they will pinch the rope, with resultant rapid wear. In each case the distorted rope is not free to adjust itself so that each strand carries its own share of the load. Not even a quality rope like U·S·S American Tiger Brand will last as long as it should under such conditions.

Make it a point to adhere to recommended tolerances for groove diameters. Check your sheave and drum grooves frequently to see that they are in good condition. Be sure that grooves are smooth and that sheaves with broken flanges are replaced before they can cause damage. Only by giving your rope such care and attention can you get the *maximum* service that is a war-time must today.

**AMERICAN STEEL & WIRE COMPANY**
*Cleveland, Chicago and New York*
**COLUMBIA STEEL COMPANY**
*San Francisco*
United States Steel Export Company, New York
*For Anthracite Service:* Miners Bank Building, Wilkes-Barre, Pa.

### Here's a book you need right now

Every user of wire rope can get a lot of good ideas from this free book. It's packed with easy-to-follow instructions, 48 pages of practical hints that will help avoid the common errors of handling and care which shorten rope life. Order as many copies as you need and get them into the hands of the right men.

*Excellay Preformed*

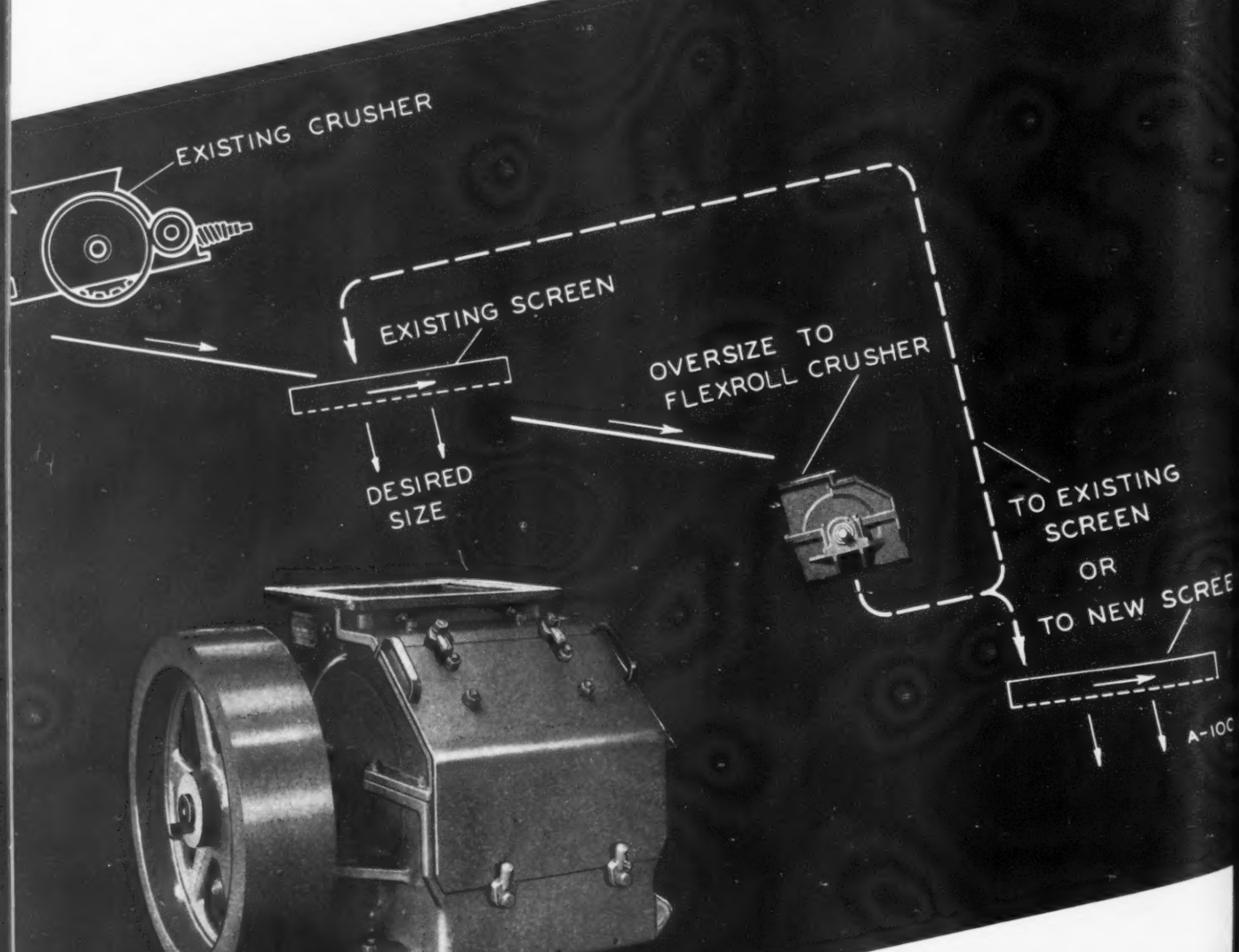
UNITED STATES STEEL

# *New! Low Cost!* JEFFREY FLEX R

Is your re-circulating load too great? Here's an inexpensive unit for crushing your oversize!

Do you want to convert a portion of your lump or egg or nut into stoker size? Use this Jeffrey Flexroll Crusher as an auxiliary unit!

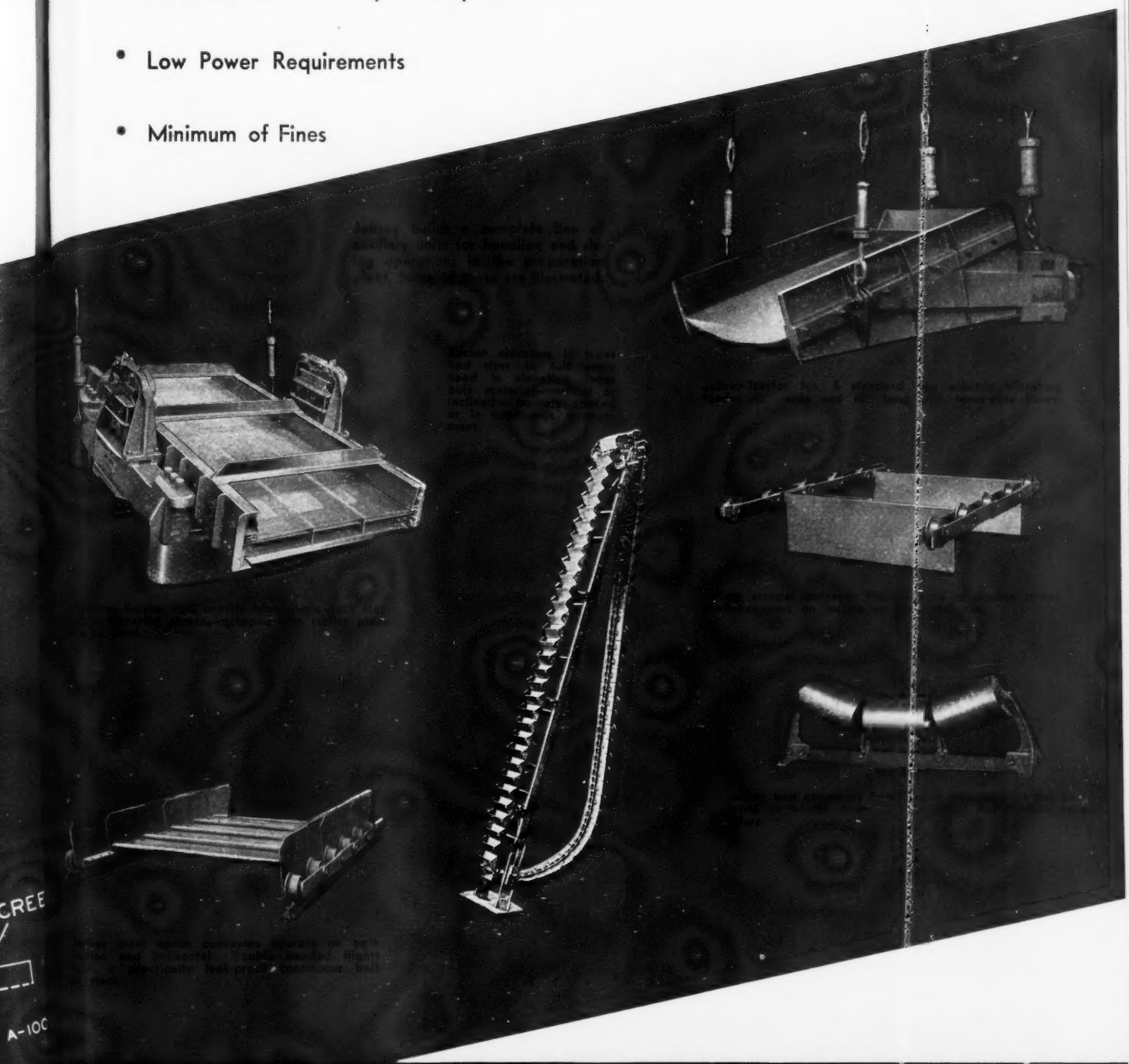
An ideal machine for mines having small capacities or where a portion of the output can be diverted to sized coal at a profit.




➡ *Send for our NEW Bulletin No. 777*

# X ROLL CRUSHER • • • FOR SMALL CAPACITIES

- Minimum installation space required
- Low Power Requirements
- Minimum of Fines



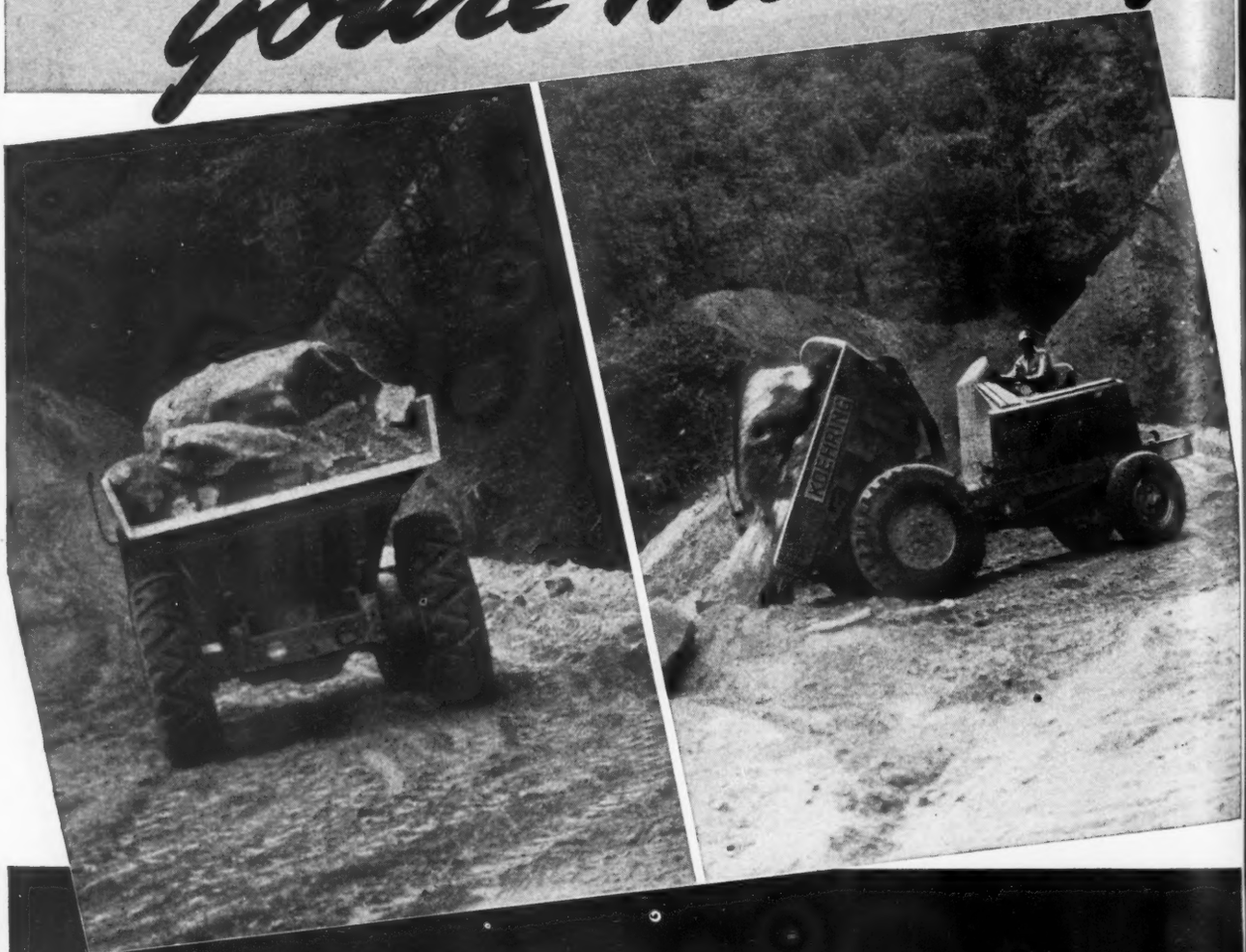
## THE JEFFREY MANUFACTURING COMPANY

*Established in 1877*

912-99 NORTH FOURTH STREET, COLUMBUS 16, OHIO

| | | | | | |
|---|---|---|---|---|---|
| **Sales Offices:** | Baltimore<br>Birmingham<br>Boston<br>Buffalo | Chicago<br>Cleveland<br>Cincinnati<br>Detroit | Denver<br>Harlan<br>Houston<br>Huntington | Milwaukee<br>New York<br>Philadelphia<br>Pittsburgh | Scranton<br>St. Louis<br>Salt Lake City |
| **Service Stations:** | Pittsburgh<br>Harlan, Ky. | Birmingham<br>St. Louis | Logan-Beckley<br>W. Va. | Scranton | |
| **Foreign Plants:** | Jeffrey Mfg. Co., Ltd.<br>Montreal, Quebec | British Jeffrey-Diamond, Ltd.<br>Wakefield, England | Jeffrey-Galion (Pty), Ltd.<br>Johannesburg, S. A. | | |

# If it's Rock you're Hauling




## KOEHRING DUMPTORS ARE YOUR BEST BET

Here is good pictorial proof that Koehring Dumptors can haul and dump rock of any reasonable size and come speeding back for more. Wide body opening means easy loading, and gravity dumping is instantaneous. The massive chassis easily withstands the shock of constant heavy duty service. Koehring Dumptors will save you valuable time too, with three speeds in either direction, quick load spotting and dumping up to the edge of the fill. Haul rock faster with a Koehring Dumptor.

Your Koehring Dumptor will last much longer with proper lubrication and care . . . depend on your Koehring equipment distributor and use genuine Koehring parts.

**KOEHRING COMPANY** • *Milwaukee, Wis.*

KOEHRING HEAVY DUTY

**HEAVY-DUTY CONSTRUCTION EQUIPMENT**

★ Loaded cars ready for rotary dump

★ Conveyor (before enclosing) connecting transfer house and tipple

★ Underground conveyor in rock tunnel

# THE *Geneva* MINE

•

## A MAJOR DEVELOPMENT OF GREAT SIGNIFICANCE

•

While primarily a war-time development, owned by the Defense Plant Corporation, the Geneva Mine will have a profound influence on post-war operation. The reason for this is that the coal produced is primarily for the making of coke for steel production.

In addition, this first major expansion in the production of steel west of the Continental Divide introduces an entirely new distribution set-up. The absorption of the products of the combined operations will have much to do with an increased usage of steel products on the west coast and foreign lands reached through Pacific Ocean lanes.

IE

*eva*

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reached through
s.

★ General view through Horse Canyon

★ Transfer house where coal is crushed and delivered to conveyor

★ Tipple where coal is loaded in cars for delivery to coke ovens

Underground conveyor in test mine

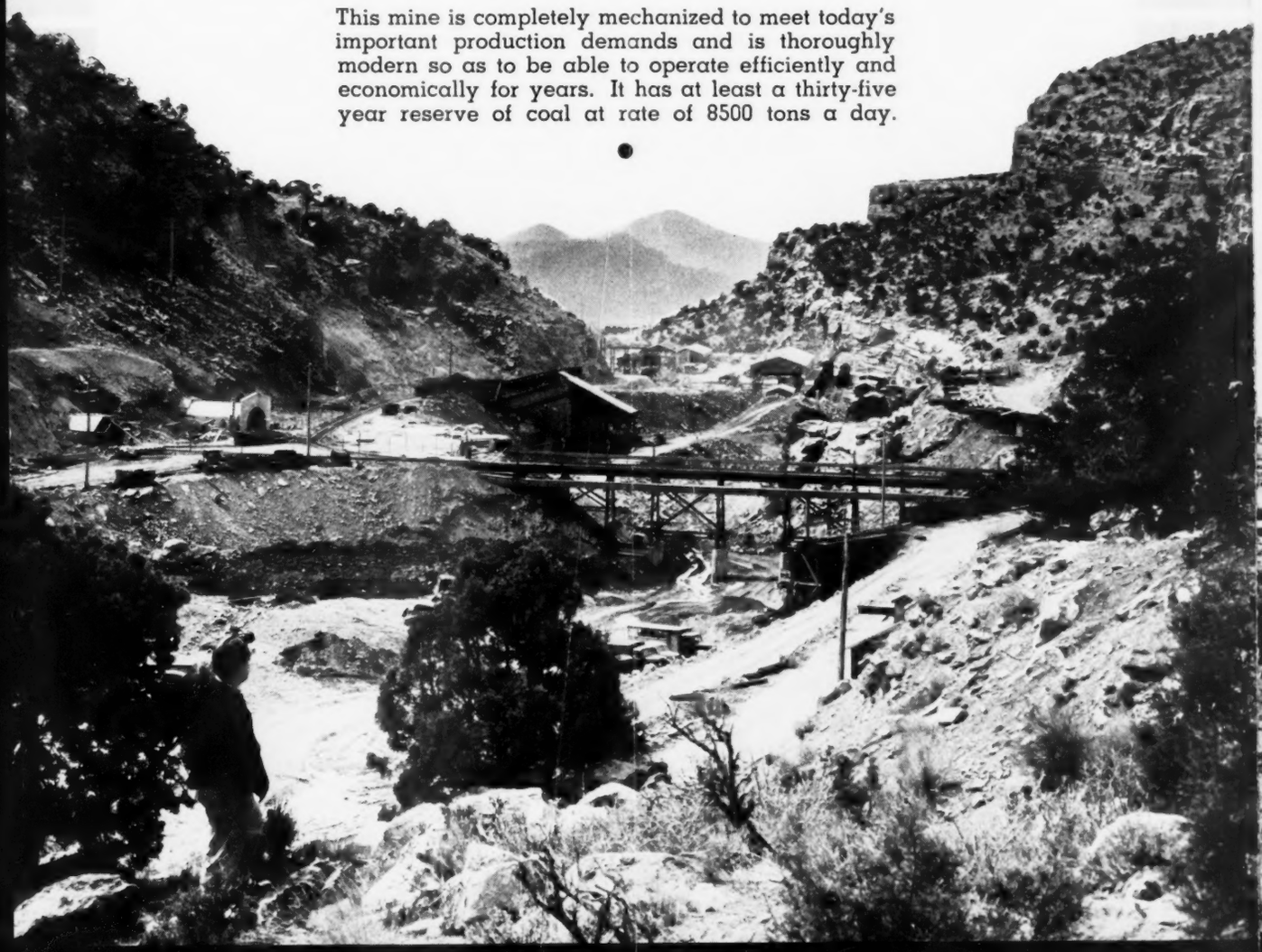
# THE *Geneva* MINE
## *at* HORSE CANYON, UTAH

## *Becomes*
## LATEST EXAMPLE OF
# ALLEN & GARCIA
## *Specialized Mining Engineering*

• The Geneva Mine, now in production, is already the largest producing underground coal mine west of the Mississippi. It was engineered and designed both above and below ground by the Allen and Garcia Company and was operated by this organization for more than a year during the development period.

This mine is completely mechanized to meet today's important production demands and is thoroughly modern so as to be able to operate efficiently and economically for years. It has at least a thirty-five year reserve of coal at rate of 8500 tons a day.

•



# AN OPERATOR'S ENGINEERING DESIGNING *and* CONSTRUCTION *Organization*

☆

## SCOPE OF SERVICES

- Organization, operation, and management of mines
- Design and construction of new plants and their various units
- Below ground modernization and mechanization
- Reconstruction, revamping, or improvements of existing plants
- General consulting work regarding power, equipment, operation, and various mining problems
- Valuations for financing, fire-loss, taxation purposes — reports and appraisals

☆

★ Allen & Garcia Company is an organization of engineers exclusively, acting as consultants in the interest of its clients and whose responsibility is undivided.

Our engineering specialists have a wealth of accumulated experience gained from all producing areas. We have secured data from every seam in this country and many other countries, adding materially to our capacity to contribute the most in operating advantages for our clients including year after year economy.

We specialize in below ground modernization and mechanization as well as offering a complete engineering and design service for above ground. A & G engineers have originated and successfully executed many producing betterments. These men have been associated with us since before World War I and are fully acquainted with the broad and diversified problems of mining and marketing.

Thus a deep-rooted knowledge of coal mining conditions is back of every project we undertake. Our engineers are ready now to cooperate with you. Consultation does not entail any obligation on your part.

# ALLEN & GARCIA COMPANY

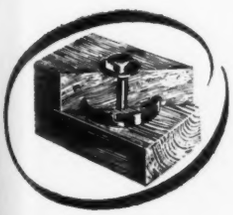
*Consulting and Construction Engineers*

332 S. Michigan Ave., Chicago, Ill. 120 Wall Street, New York, N.Y.

# Structural Engineers and Architects — by the Thousands — are using these TECO SERVICES

Many leading companies and government agencies use Teco services. Upon request, Teco engineers have consulted with the engineers of the Army, Navy, and Maritime Commission, The Austin Company, Chas. T. Main, Inc., the Higgins Industries, Inc., and many others on the preparation of timber designs.

You, too, will find the Teco Consulting Service, Design Data Service, Typical Design Service and Research Service of great help in designing and building with timber. Teco distributors and fabricators in all parts of the country * can render helpful services, too. TIMBER ENGINEERING COMPANY—Washington — Chicago — Minneapolis —Portland.



* Firms and addresses supplied on request.

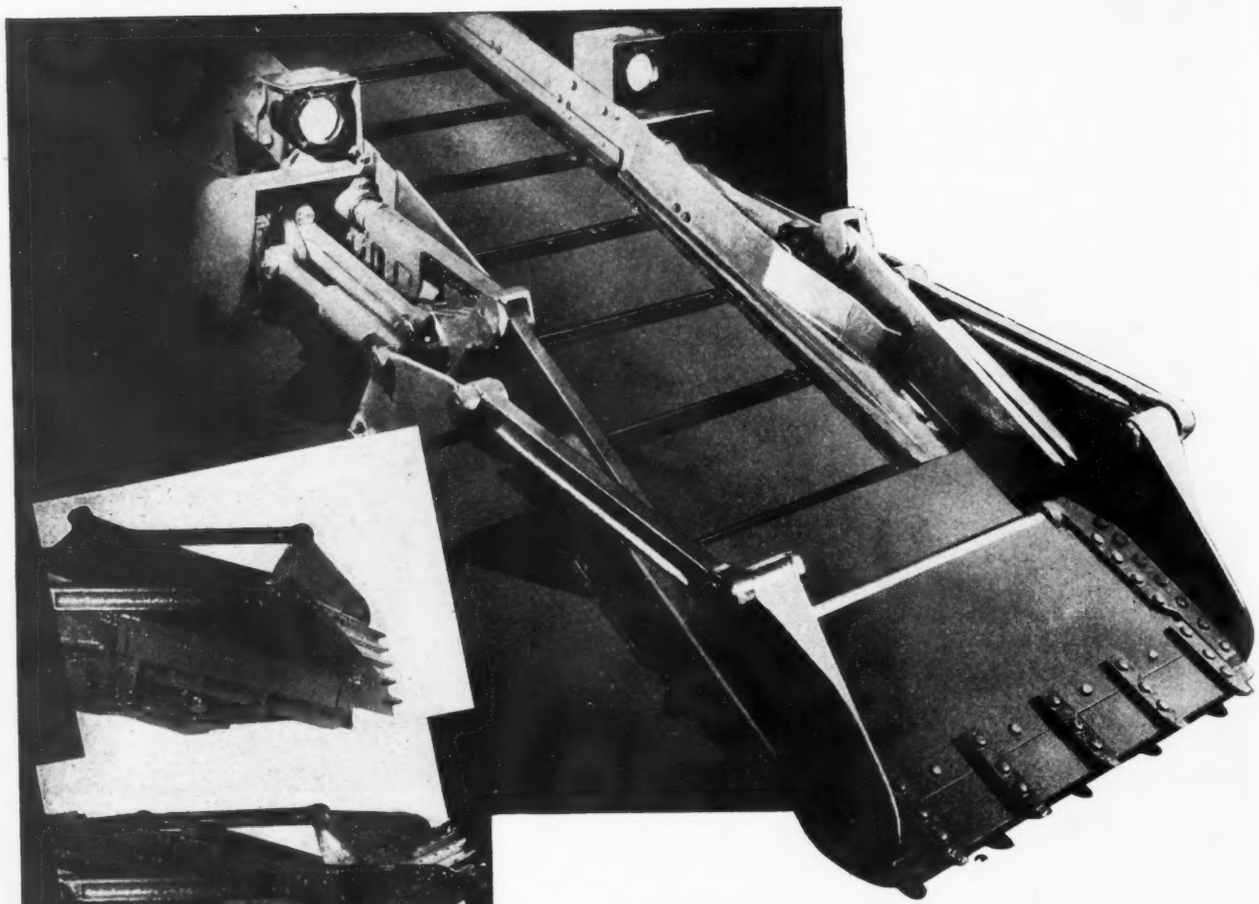
Timber Engineering Company,
1319 18th St., N. W., Washington 6, D. C.

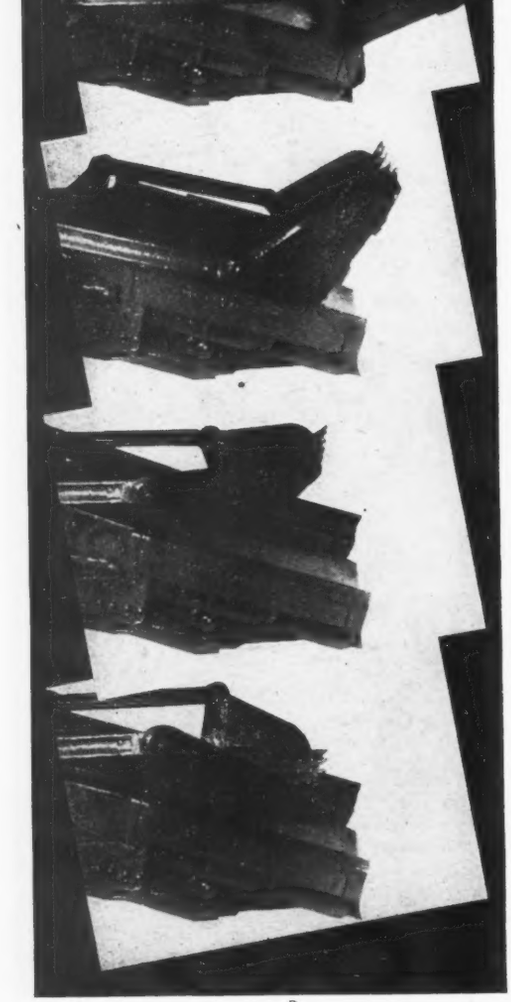
Please send me by return mail a Free copy of *"BUILDING for BATTLE—With the United States Navy."* The story in pictures of the Navy's spectacular use of lumber and timber during the Second World War.

Name.....

Firm Name.....

City.....State.....





# 47 STROKES EVERY 60 SECONDS

● If you are contemplating the purchase of a mechanical loader, make a detailed investigation of the latest Whaley "Automats". Learn why Myers-Whaley loaders stay in service so long. Some of them have been in use for over 20 years.

The "Automat" is the only loader available with that natural, smooth running, automatic shoveling head. Shovel operates at the rate of over three-fourths of a complete stroke per second; is almost four feet wide and handles tremendous lumps of coal without batting them around. No dragging of coal . . . no dragging friction of loading mechanism . . . no crushing or unnecessary breakage of coal.

The loading head is the "business end" of any loader. All other loading functions of a machine, regardless of their individual efficiency, depend upon that loading head for their effectiveness. It's this loading head you are most interested in for production—don't overlook it. Since its inception—over 35 years ago as the first commercially successful mechanical loader—this shoveling principle of loading has been brought to its highest point of efficiency, the proved results of which have made the Whaley "Automat" so much in demand today for maximum production at the lowest cost per ton of material handled.

Then, bear in mind that only one 25 H.P. motor is required to operate the "Automat". This means worthwhile savings when compared with other machines of equal capacity that use double or more than the power requirement of the Whaley "Automat".

*Write for complete information.*

Myers-Whaley Company,
Knoxville, Tennessee

● The five illustrations at left show the vertical shovel motion of the "Automat" . . . the feature that makes this machine the safest loader known. The action photos from top down shows Shovel head moving in under material, carrying it back for deposit on front conveyor and immediately, shovel starts its return for another shovel load of coal . . . all of which occurs within approximately one second, or 47 strokes per minute.

MYERS-WHALEY CO.
Makers of "Automat" Shovels

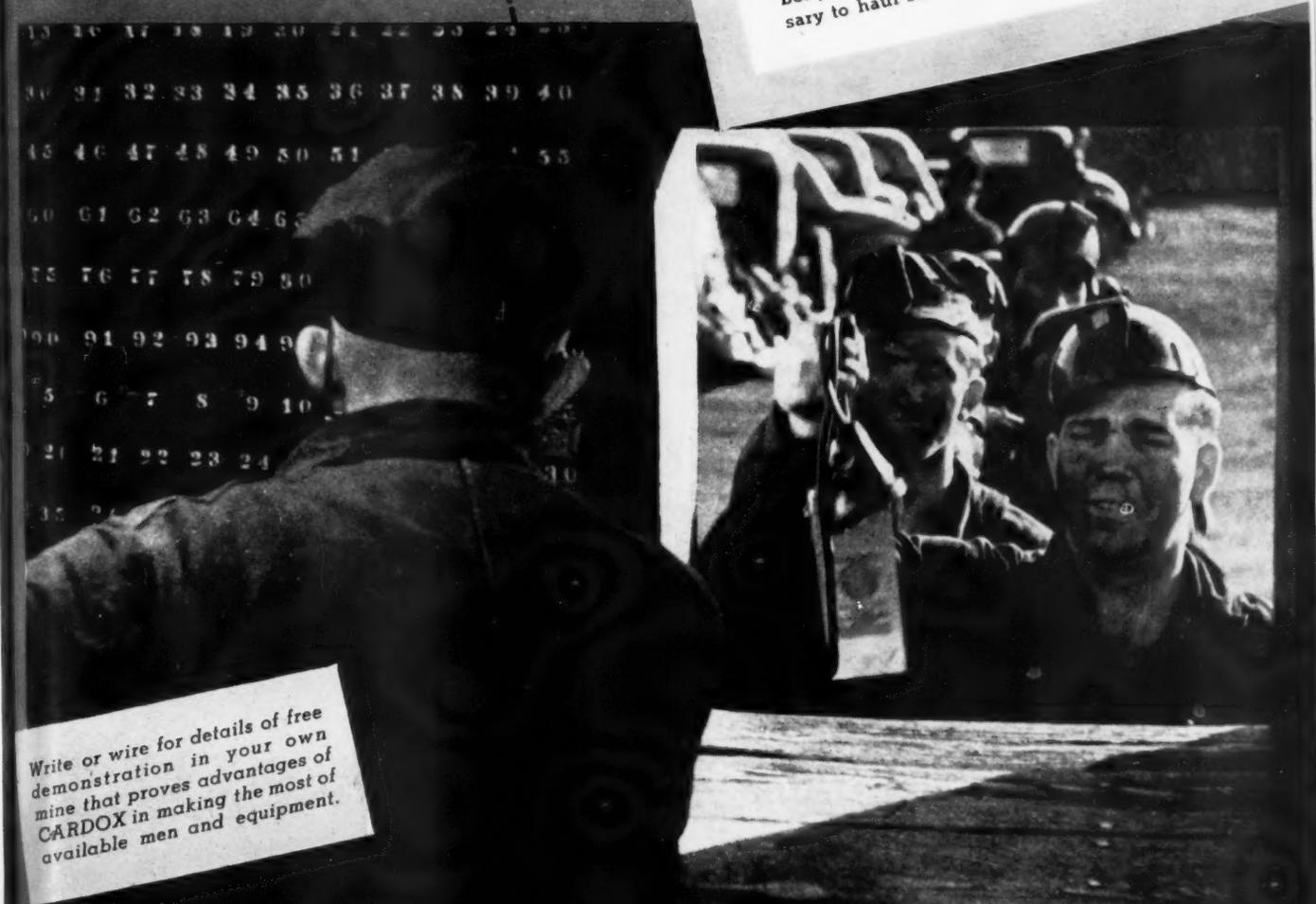
*Mechanical Loaders Exclusively for Over 35 Years*

# CARDOX

"THE NON-EXPLOSIVE MINING METHOD"

## Conserves MANPOWER

**CARDOX** helps step up production to meet wartime needs by making it possible to work the face efficiently with fewer men . . . and less experienced men. Several factors contribute to this **CARDOX** advantage. Coal can be broken down just as fast as falls can be loaded because **CARDOX** produces no smoke or noxious fumes. Loading is faster because **CARDOX** rolls out the coal for easier handling. Mechanical equipment can be used to maximum advantage. Wear and tear on loaders are greatly reduced. Hand digging is reduced to a minimum. The gentle heaving action of **CARDOX** produces a larger percentage of coarse sizes. Consequently it is possible to remove slate and bony bands right at the face . . . making it unnecessary to haul such waste materials to the surface.



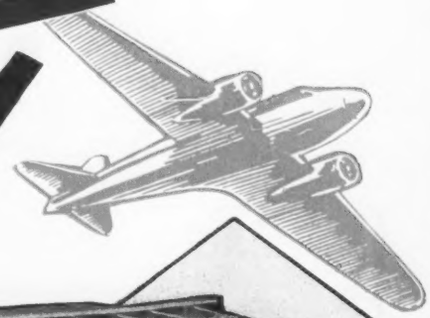
*Write or wire for details of free demonstration in your own mine that proves advantages of CARDOX in making the most of available men and equipment.*

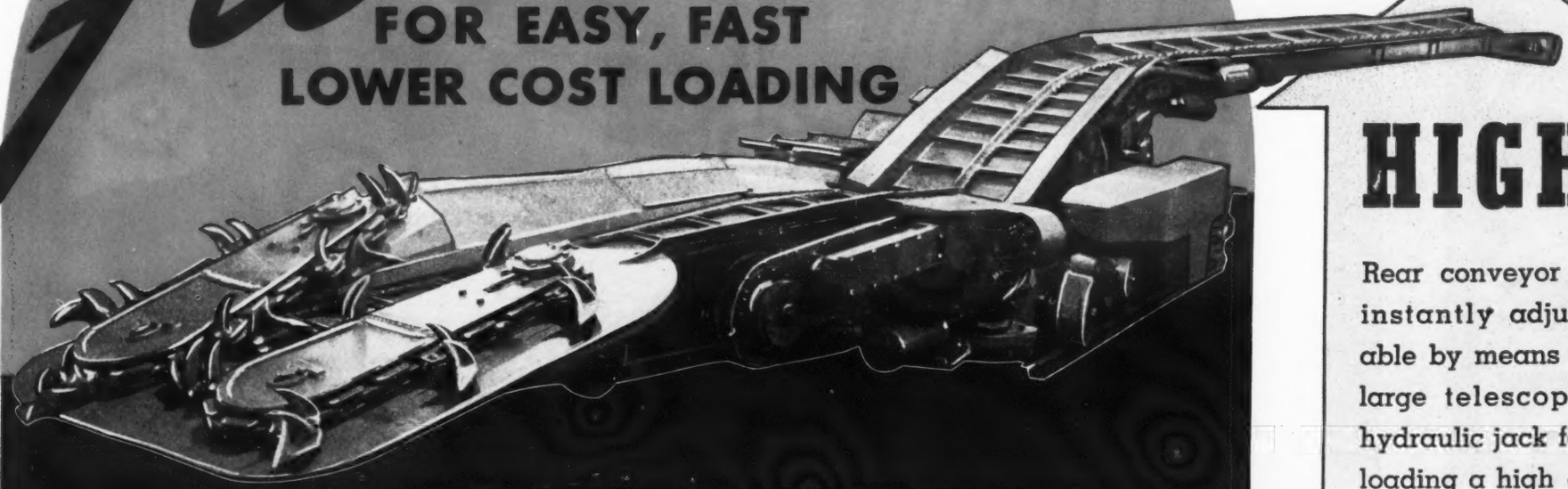
**CARDOX CORPORATION** • **BELL BUILDING** • **CHICAGO**

REAR CONVEYOR

# Flexibility

FOR EASY, FAST LOWER COST LOADING





• This lowest track loader on wheels is built rugged and strong. It has an unusual wide range of applications. The Clarkson 24BB has the flexibility that counts for fast coal digging and loading. Operator handles all controls from one central point. Has vertical or horizontal adjustment.

## HIGH

Rear conveyor is instantly adjustable by means of large telescopic hydraulic jack for loading a high or low mine car. Conveyor can be adjusted horizontally with the car also.

LOWEST LOADING MACHINE ON WHEELS

The rear conveyor is so designed

vertical or horizontal adjustment.

LOWEST LOADING MACHINE ON WHEELS

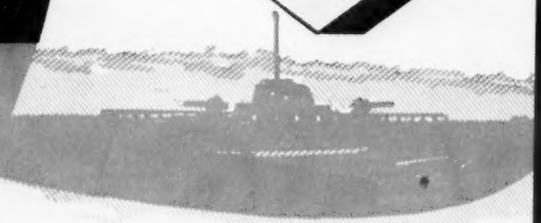
## Highest Coal Line only 23" from rail

The front head on the Clarkson 24BB can be raised or lowered at the will of the operator. The reason is the two 6" hydraulic jacks mounted on each side of the head and directly ahead of the ring on the front bumper. Operator easily follows the floor of the mine, simply adjusting digging head as the work proceeds. Tight corner shots are dug out perfectly. Built for 38-inch coal and over. The alloy digging arms are riveted to chain blocks—no bushings or swinging arms to wear.

# CLARKSON Universal LOADER 24 BB TRACK MOUNTED

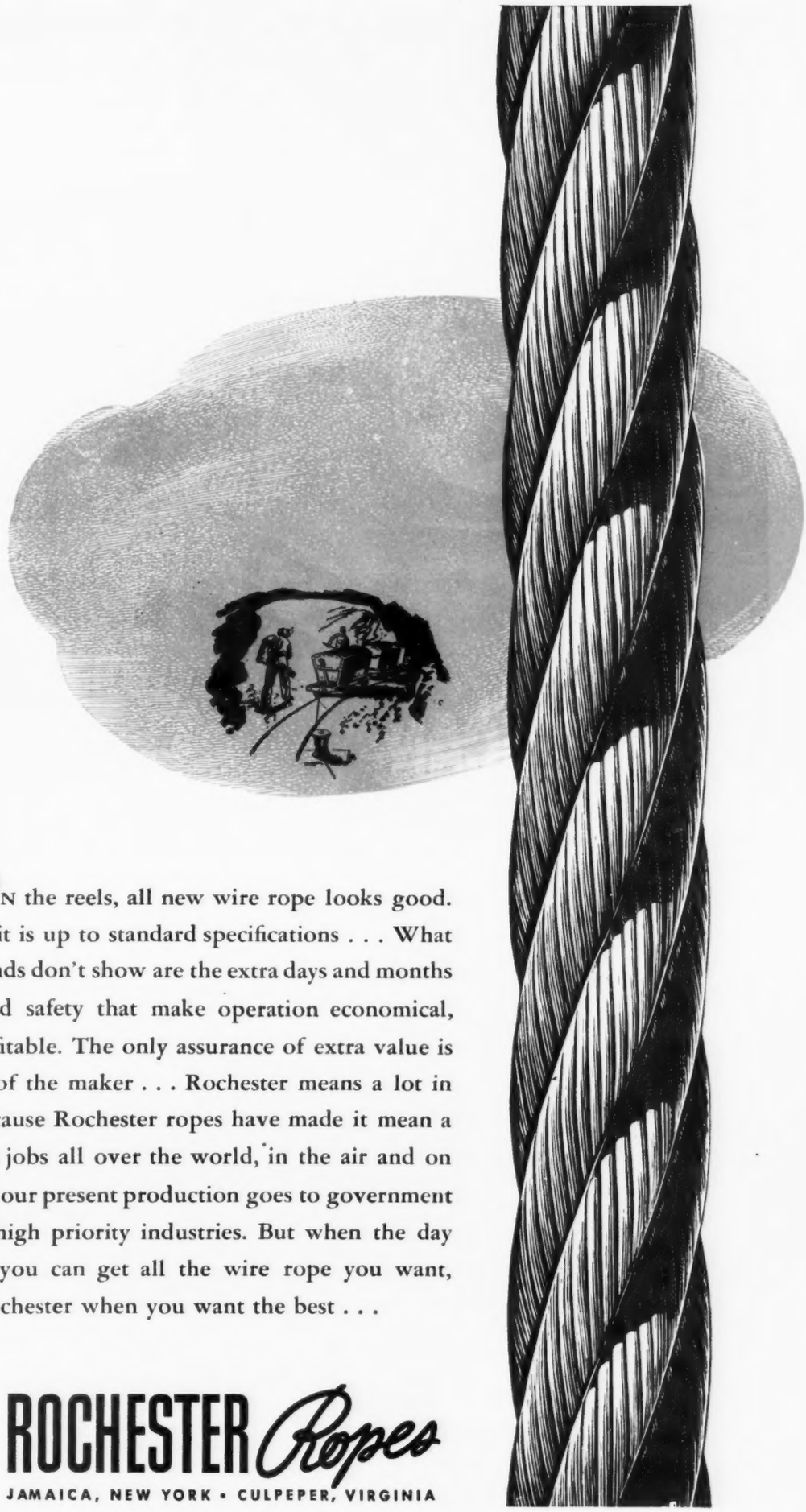
The rear conveyor is so designed that the tail end rests on the ground when not in operation. This keeps the tail out of the trolley wires even in very low coal

**LOW**



THE *Clarkson*
MANUFACTURING COMPANY
Nashville, Illinois

PROX
FOUNDED
1875
"COAL TEETH"—the Prox alloy tool steel precision hardened double point bits —put more bite in any mining machine.
A salute to all you Old Timers now responsible for getting out the tons needed for Victory. Remember how, in the other war, you wrestled with your old chain breast machines—and didn't they cut more tons for you with Prox chains?
FRANK PROX COMPANY, INC.
TERRE HAUTE. INDIANA- 1205 S. FIRST STREE



On the reels, all new wire rope looks good. And most of it is up to standard specifications . . . What the outer strands don't show are the extra days and months of service and safety that make operation economical, contracts profitable. The only assurance of extra value is in the name of the maker . . . Rochester means a lot in wire rope because Rochester ropes have made it mean a lot—in tough jobs all over the world, in the air and on the sea . . . All our present production goes to government services and high priority industries. But when the day comes when you can get all the wire rope you want, remember Rochester when you want the best . . .

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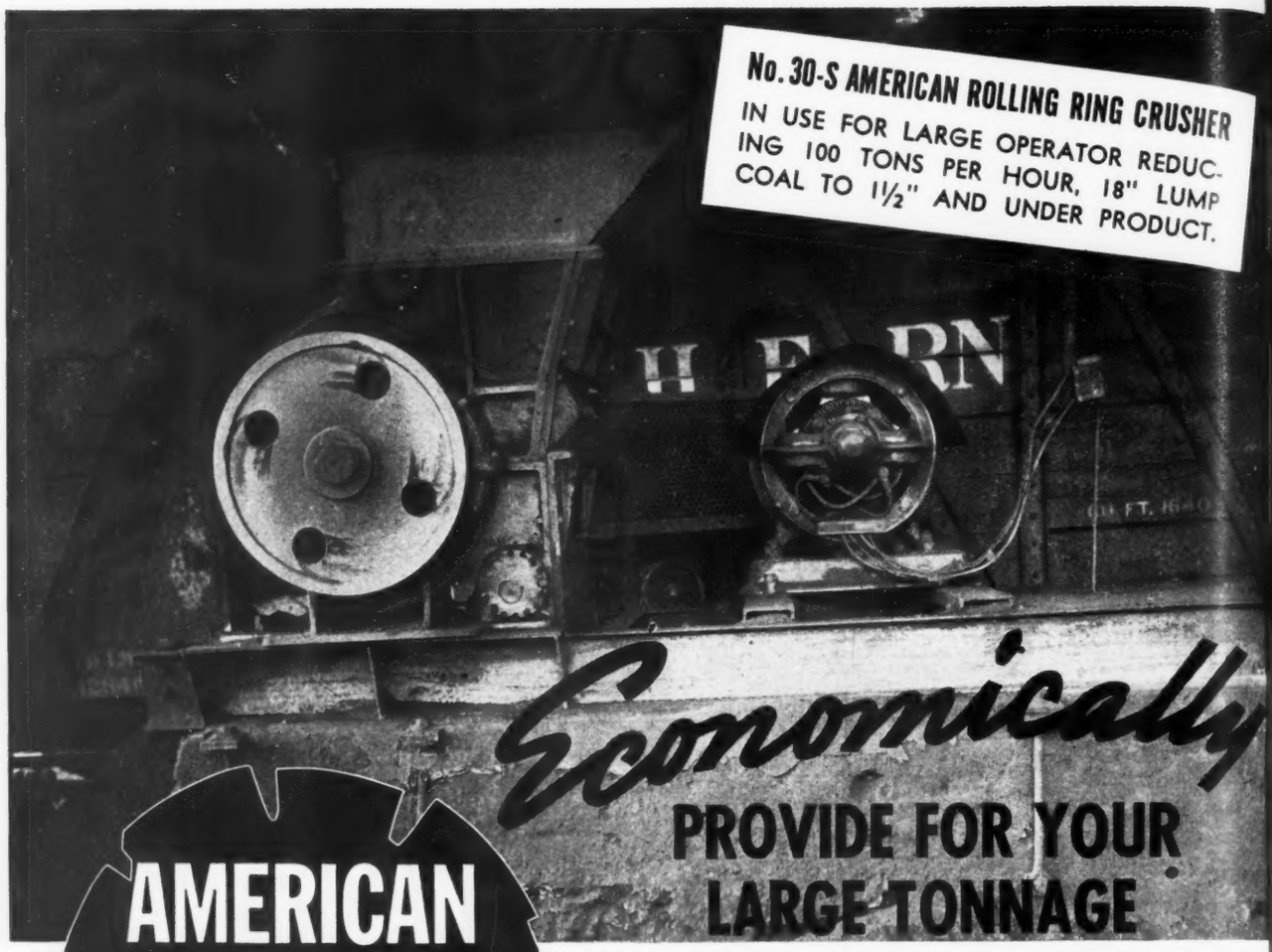
No. 30-S AMERICAN ROLLING RING CRUSHER
IN USE FOR LARGE OPERATOR REDUCING 100 TONS PER HOUR, 18" LUMP COAL TO 1½" AND UNDER PRODUCT.

# Economically PROVIDE FOR YOUR LARGE TONNAGE CRUSHING • • •

## AMERICAN *Type "S"* ROLLING RING CRUSHER

● The splitting action of the SHREDDER RINGS shatters and distributes the coal before it reaches the Breaker and Grinding Plates.

These patented reversible manganese steel SHREDDER RINGS are found only in the American Rolling Ring Crusher. They have twenty cutting edges or teeth and are designed to maintain their outward position by centrifugal force at the specified speeds. In contact with solid metal, the rings are momentarily deflected from their usual course because they are free to swing back out of position. There are no shear pins or other safety devices that require attention.

★ Get the assurance of uniform sizes for either stoker or pulverizer coal as you crush larger tonnages. In service for many mines the American Rolling Ring Crusher demonstrates its ability to crush coal at a total of less than one cent per ton, including power, labor, maintenance, and interest on investment. The splitting action of our patented manganese steel shredder rings reduces fines to a minimum—the coal is split instead of being crushed.

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**AMERICAN PULVERIZER COMPANY** 1119 MACKLIND AVENUE ST. LOUIS, MISSOURI

ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS

# HAZARD LAY·SET *Preformed* REWARDS YOU BY—

*One of these invariably justifies its specification*

1 LASTING LONGER
2 BEING SAFER TO HANDLE
3 SPOOLING BETTER
4 BEING FASTER TO INSTALL
5 **REQUIRING NO SEIZING**
6 REFUSING TO "PORCUPINE"
7 MAKING LANG-LAY MORE SERVICEABLE
8 BEING FREE OF TENDENCIES TO KINK
9 RESISTING BENDING FATIGUE LONGER
10 GIVING YOU GREATER DOLLAR VALUE

The absence of internal stresses in Hazard **LAY-SET** Preformed wire rope makes it unnecessary to seize the rope with serving wire before cutting. Every wire and every strand is "at ease," comfortable in its assigned position, not at straining odds with every other wire and strand as is the case with non-preformed rope. Here is proof positive that **LAY-SET** is easier, faster, and safer to handle; that being free of torsional strain it will work better, last longer, give greater dollar value. Specify Hazard **LAY-SET** Preformed for *all* its built-in advantages.

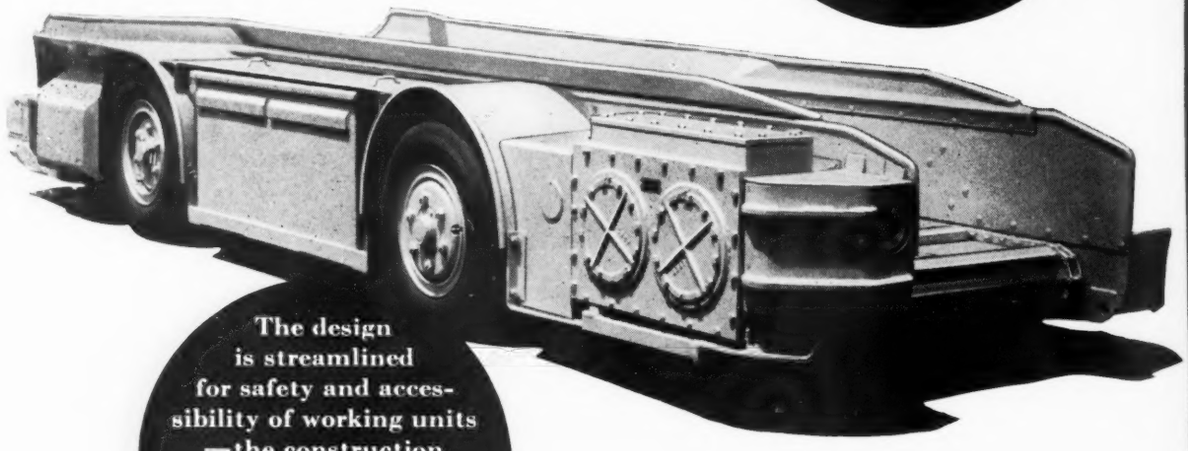
**HAZARD WIRE ROPE DIVISION,** Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Fort Worth, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Portland, Tacoma
**AMERICAN CHAIN & CABLE COMPANY, INC.** • BRIDGEPORT • CONNECTICUT

**HAZARD LAY·SET *Preformed* WIRE ROPE**

# The New Joy 32-D

The steering is reversible—with dual starting and braking controls—increasing not only the factor of safety—but also materially speeding up operation

Safety and accessibility are the objectives of this new 32-D design. For instance, the driver's compartment is so arranged that nothing impedes his exit in case of emergency. The tilting steering wheel and the dual foot controls are a new and novel feature—permitting the driver to face forward at all times.

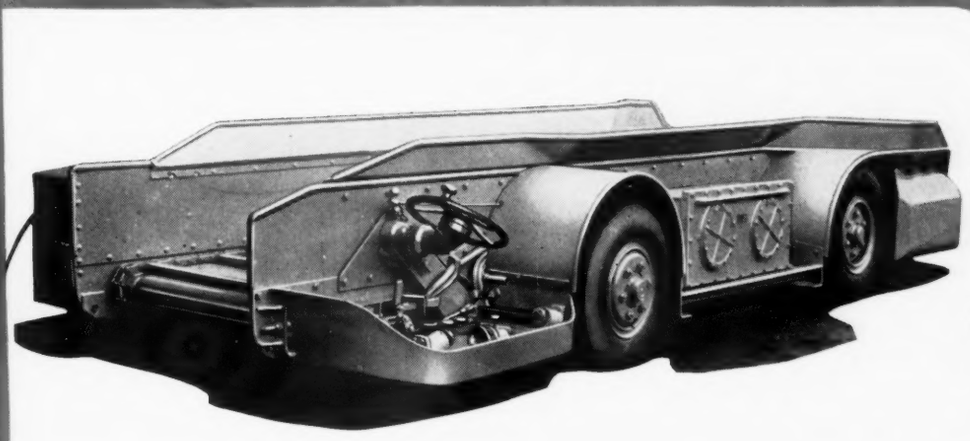


The design is streamlined for safety and accessibility of working units—the construction and fabrication is extra rugged and extra strong, assuring long, continuous service

Every working part is quickly accessible in this new design, which has been planned with a view to saving upkeep time and expense.

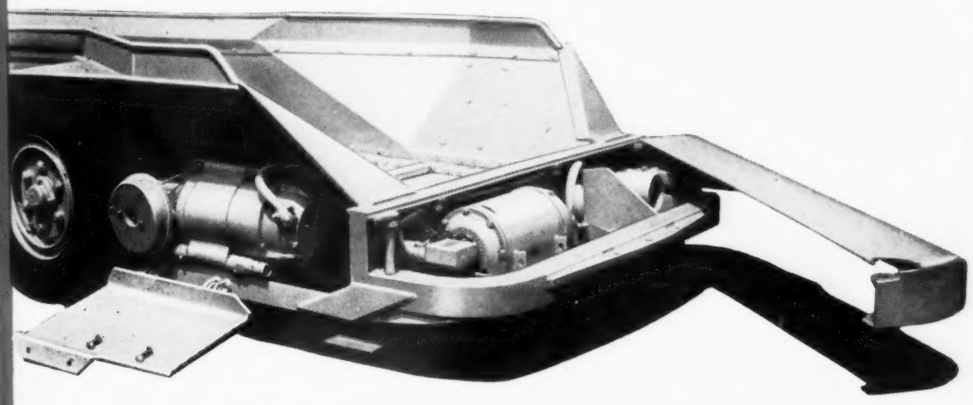
*New Safety and Accessibility*

# Shuttle Car!



THE 32-D SHUTTLE CAR IS AVAILABLE IN CABLE REEL AS WELL AS BATTERY TYPE

The same outstanding features that characterize the Battery type are built into the Cable Reel type—fast, safe . . . and all moving or vital parts accessible for quick inspection or repair.



REAR VIEW, SHOWING SIMPLICITY OF CONSTRUCTION

The 32-D Shuttle Car is not only fast and completely mobile, but it is also built to stand service, hard continuous service, with a minimum of upkeep. Its safety features, the ease with which driver can get in or out of driving seat platform, its reversible controls enabling operator always to face in desired direction—the accessibility of vital working parts—all of these points are important and mean more output per unit—and lower costs per ton.

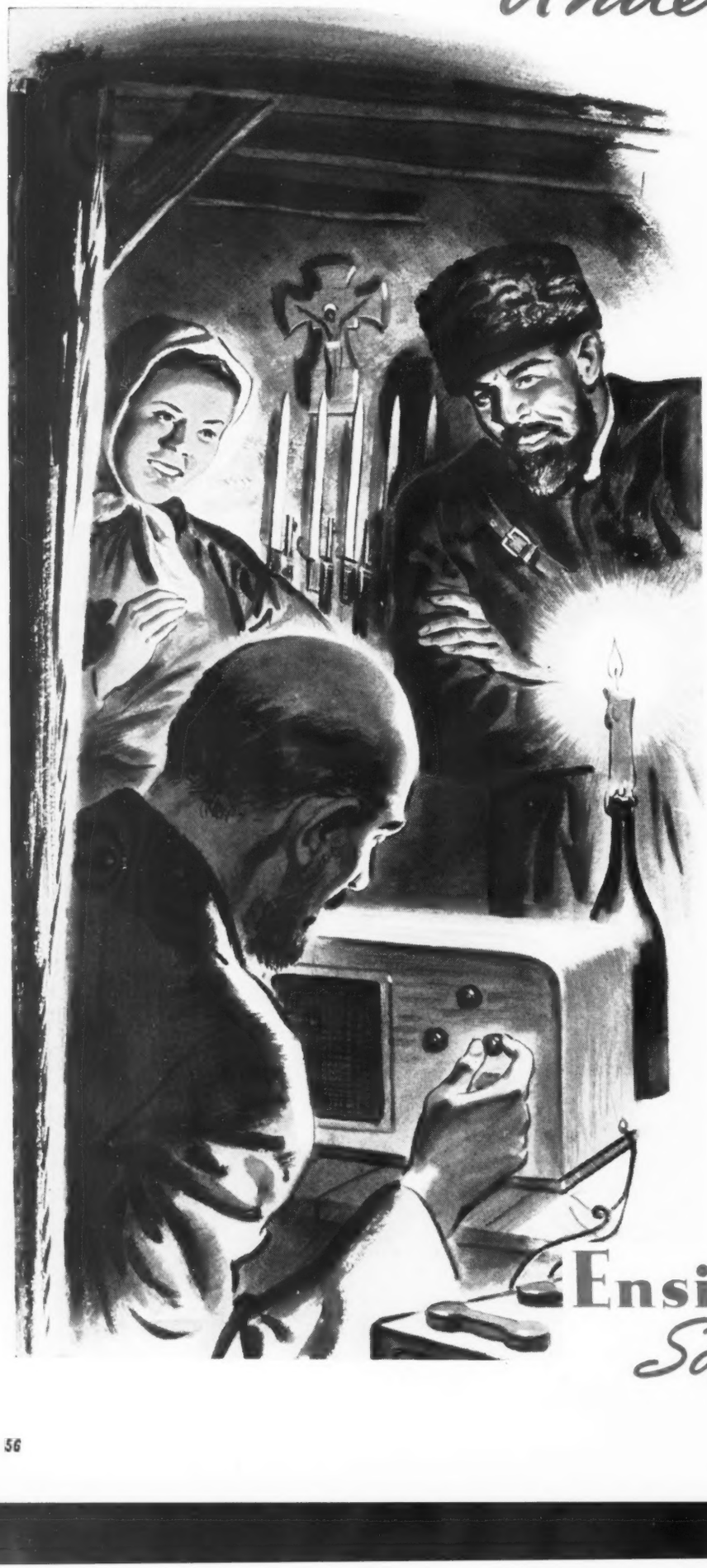
HINGED BACK BUMPER, AND VIEW OF CONVEYOR

This hinged back bumper design is an important feature of this new car permitting complete accessibility to the conveyor mechanism, junction boxes and headlights. Another feature is the removable hinged motor cover, giving quick access to the rear hydraulic brakes, driving speed reducer and motor brushes.

**JOY MANUFACTURING CO.**

**Franklin, Penna.**

# Victory begins *Underground*



YES, the underground of which you are a part, Igor and Petrov, has played a vital part in disrupting the plans of the Nazi Supermen in Occupied Russia.

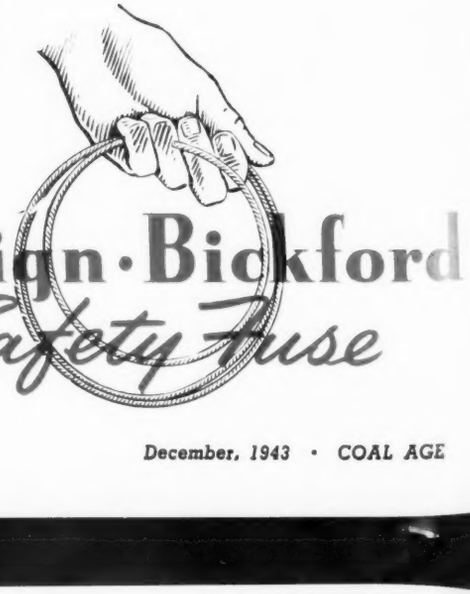
The Red Army, strengthened by American-made tanks, guns and planes, is slowly crushing the ruthless invader back . . . back past the Dnieper River Valley where you were once free men. Other Allied Nations are crowding your captors from the East, South and West.

Over here skilled men are engaged in another underground activity—that of blasting out the coal and ore and stone that go to make up the fighting equipment of the Allied Nations. We make the Ensign-Bickford Safety Fuse and Primacord-Bickford Detonating Fuse *so essential to essential blasting.*

*Victory Begins Underground.*

L-8

THE ENSIGN-BICKFORD CO.
SIMSBURY, CONNECTICUT



# Coal Age

DEVOTED TO THE OPERATING, TECHNICAL AND BUSINESS PROBLEMS OF THE COAL-MINING INDUSTRY

December, 1943

## End and Beginning

THE END of at least some of coal's difficulties appeared to be in sight at the time this was written. If such should prove to be the case, the industry and the public undoubtedly are entitled to sighs of relief. This is said notwithstanding the fact that in the case of the public the relief is tempered by the price increases involved and in the case of the operators by the contemplation of the problems left on their hands by the mode of settlement.

Faced with a multitude of wartime restrictions on freedom of action and with a series of demands beyond their power, under such restrictions, to grant, the coal operators were forced to turn to Washington for guidance in the settlement of these demands. Their experience is scarcely an advertisement for the alleged benefits of government control. While the miners' leader was left free to proceed at will, their properties were twice seized and they finally were left with no alternative but to accept a contract involving substantial cost increases, disturbing established relationships by imposing varying costs on individual mines through the device finally adopted for taking into account travel time, and offering the strong possibility of further cost increases in the future when a drive to reduce working hours can again be expected.

But while the settlement in process of being worked out poses grave new problems, it can be said with equal conviction that coal can solve them if not hampered by further interference. And by solving them, it will justify its right to continued freedom of action in the peacetime to come.

## 50 Tons per Man

EFFICIENT production is a major wartime problem, as might naturally be expected. But it will be even more a necessity when the nation resumes its peacetime pursuits. The reason for more efficient production is self-evident—helping the consumer achieve the maximum economy in coal use. In turn, this will assure coal mining, its employees and its stockholders the maximum return from the greatly increased opportunities which all signs indicate are in the offing, if not here.

What are the possibilities for efficient coal production? One authority recently declared that even with available equipment and methods a production of 50 tons per man into the railroad car was not unreasonable in many cases. New equipment now on the drafting board is expected to go even farther toward insuring a major increase in the national average of the industry when coupled with new methods more closely related to the materials-handling job which coal mining is.

Time and money devoted to more efficient methods and equipment will help—now—in the No. 1 job and will give coal mining that much of a start on its postwar task of providing a quality fuel at the lowest possible cost. Thus, efficient production will complement the industry's work in research, labor relations and public relations to provide, with better service, more opportunities for employment and a reasonable profit on investment. The possibilities of efficient production have not been more than scratched. As the industry digs deeper into them it will benefit accordingly.

## Vital Too

PAPER is no longer just paper but a vital war material. As such, it must be conserved and stretched the same as other critical war materials, and when no longer needed for its primary purpose must be salvaged for conversion into other needed products, such as casings for shells used on the battle fronts. Fewer men to cut pulpwood on the one hand and greatly increased consumption in industry and the war effort on the other make conservation a necessary order of business.

Coal mining has had experience in the conservation and salvage of other materials. This magazine also is enlisted in the drive to conserve critical metals and materials, such as the copper, zinc and rubber used in printing. It is conserving paper by reducing margins, weight and other steps. Your daily newspaper is faced with the same problem, on which turns its ability to render the maximum service. By eliminating nonessential uses and by making every piece go as far as possible and then routing it to the salvage authorities, you can make a long stride toward insuring a sufficient supply for vital war and essential civilian consumption. Make your paper stretch. It will help win the war.

# Coal Mining and Government

## HOW WARTIME CONTROLS HAVE OPERATED

"GOVERNMENT can do it better" has been the theme song of a very vocal group in recent years, especially since the New Deal came into power. But can government do it better? True, there are some things that logically fall within the purview of government and which it can do better than any private group. But those advocates of increased government power put no limits on the controls to be exercised up to and including nationalization and complete operation of industry. World War II, as the coal industry well knows, has seen a wide extension of government control over all business. The question is: "How have such controls worked?" Does wartime experience promise the unending flow of benefits in peacetime that proponents of government in business have advertised so diligently?

If government could do it better, it would seem that it could achieve by far the best results in wartime when ordinary considerations become of secondary importance and industry is ready to sacrifice to achieve the No. 1 goal—victory. But has it worked that way? More specifically, has it worked that way in coal mining?

Whether the course of events since last May 1—and earlier—would have been different had the coal industry not been subject to the limitations placed upon it by government is of course impossible to prove one way or another. But the record under government control, with its restrictions on management in the fields of collective bargaining, prices, manpower and other normal functions, is clear: four work stoppages and two property seizures in 1943.

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**WAR, among other things, has provided an opportunity for assaying the practicability of government control of industrial operations. Admitting the necessity for controls during hostilities, do the results warrant their continuance or the imposition of new regulations in peacetime? Coal mining is a case in point. Its experience in trying to produce in the past few months under the limitations and restrictions set up by various federal agencies is no advertisement for the benefits of government in business.**

★ ★ ★

The future is yet to unfold, and it is to be hoped that it will improve. But the unhappy series of events in the immediate past have left behind them an ineradicable picture of complete confusion, bickering and distrust among the various government agencies trying to run one or more phases of coal mining while production suffered through strikes, slowdowns, absenteeism, manpower drains and other burdens—all problems over which the government had assumed part or all the power formerly exercised by management and for which it therefore took part or all of the responsibility.

What are the government officials and agencies now exercising many of the powers formerly considered the province of management? The following is a partial list:

The President.

Solid Fuels Administration for War.

Coal Mines Administration (for the duration of seizure).

Office of Price Administration.
Office of Economic Stabilization.
War Manpower Commission.
Selective Service System.
Department of Labor.
National War Labor Board.
Combined Production and Resources Board.
War Production Board.
The Army.
The Navy.

The controls exercised by several of these officials and agencies, and others, are, of course, indirect but that is no sign that they are no less powerful. But powerful or not, onerous or not, it is apparent, since war justifies many things, that it is not so much the controls themselves to which objections are raised as the manner in which they are exercised—or not exercised, as the case may be. One of the outstanding characteristics of the Washington scene is the battling between officials and agencies over how, when and where controls should be exercised. In the case of coal, for example, Solid Fuels and the Coal Mines Administration, both with the same head, are about the only agencies which do not find themselves at loggerheads at one time or another—often at the expense of war production.

Perhaps the Washington picture may change, but as it stands at the moment it can hardly be offered as an unqualified testimonial to the benefits of thorough-going government control of industry, still granting that certain forms of control are both logical and desirable. No testimonial, also, is the disruption of orderly procedure and penalties on industry and its customers growing out of sudden and arbitrary exercise of sweeping and indefinite powers.

Seizure No. 1 was an example of sudden and arbitrary exercise of sweeping and ill-defined powers. Seizure No. 2 brought with it a wage contract by administration fiat. The arbitrary exercise of such powers also cropped out in other ways, such as the application of sanctions—seizure—against the innocent party to a controversy while leaving the other free to pursue his course unchecked.

At the risk of wearisome repetition, it might be worth reviewing once more some of the events leading up to the two seizures. When the Appalachian conference opened in March, limits on managerial action in granting wage increases already had been set up and later were reinforced by the "hold-the-line" order of April 8. The National War Labor Board had been set up to adjudicate disputes and determine, using the Little Steel formula, when increases in wage rates were permissible. OPA and other agencies had control of prices and other activities normally the task of management.

With John L. Lewis making it clear that his only basis of negotiation was

## How Seizure No. 2 Stands

Following, as of Dec. 4, is the status of various phases of coal-mine operation under Seizure No. 2 on the basis of information available to *Coal Age:*

1. Termination—Two bases for return of properties provided in the Presidential order of Nov. 1: (a) when no longer necessary for the furtherance of the war effort; (b) in no event more than 60 days after the restoration of productive efficiency.

Signing of contract between the operators and the United Mine Workers set up as a further consideration by Administrator Ickes Nov. 15. Mines of 230 companies, however, returned up to Dec. 3 because they had suffered no stoppages and none were in prospect.

With the Southern Appalachian field and part of Alabama objecting to the proposed form of contract, operators producing some 70 percent of the bituminous tonnage voted Nov. 30 to appoint a committee to draw up a contract within the framework of the U.S.-U.M.W. instrument after John L. Lewis, at the request of Secretary Ickes, receded from his stand that the entire industry must be represented.

2. Management's Role — Substantially the same as in Seizure No. 1; permitted by Presidential order to continue to function to the "maximum degree possible."

3. Cost of Operation—Being met out of the President's emergency fund, as in Seizure No. 1.

4. Operating Organization—No large operating staff being planned by the Coal Mines Administration. Dr. Charles J. Potter named deputy administrator, as well as deputy solid fuels administrator. Aside from the deputy administrator, the only major division set up was health and safety, with Dr. R. R. Sayers, director, U. S. Bureau of Mines, as its head and John E. Jones, safety director, Old Ben Coal Corp., Benton, Ill., as assistant.

5. Prices—CMA and SFA recognize adequate ceiling prices to be vital factor in production. Anthracite price schedules promulgated by OPA on Nov. 24; average increase 62c. per ton until June 1, 1944, dropping then to an average of about 34c. Temporary bituminous schedules, providing an average increase of 17c. per ton, effective Nov. 29. OPA, effective Dec. 6, provides machinery for additional temporary relief in Amendment 74 to MPR 120.

6. Manpower—Coal Mines Administration, Dec. 3, notifies all operating managers to ask local boards for deferment of all mine workers and appeal if such request is denied.

7. Machinery and Materials—CMA and SFA bending every effort toward seeing that coal mining gets all the equipment and supplies it can use as long as war needs require.

a wage increase, the operators were left with no alternative but to ask the proper federal agencies for a decision as to what they could or could not do. But Lewis refused to recognize those agencies and no attempt was made to bring home to him his equally grave responsibilities for production in time of war. In fact, the view in many quarters in Washington was that the operators should, willy-nilly, meet his demands either by subterfuge or just plain forgetting stabilization measures.

So, with Lewis free to back up his demands with work stoppages, the administration resorted to sudden and arbitrary action—Seizure No. 1, ostensibly to end the stoppages and insure production. Actually, it merely penalized the innocent parties—the operators—while the stoppages went right on and eventually resulted in Seizure No. 2. This second seizure had legislative backing—the War Labor Disputes Act—but nevertheless it also was characterized by sudden and arbitrary exercise of ill-defined powers—a Presidential order that Lewis be given a new wage agreement to his own liking.

This contract, to which only the Illinois operators were originally parties, thus became the contract for the entire industry, not as a result of collective bargaining with operators in other fields having a chance to negotiate on its terms, but by administration fiat. And the signing of the contract set off another round of bickering among government agencies over approval and the necessary price increases. The result was price schedules, "temporary" for bituminous coal, which many operators, shipping away up to $1 or more per ton, found inadequate to meet the increases in costs over which they had no control but which they were expected to take care of even if it meant dissipating an irreplaceable asset with no chance at even a modest profit.

Neatly summing up the apparent course of government, a bituminous operator group expressed it by stating that the principal assumption seemed to be "that one agency of government can seize private properties, another agency can operate them and increase wages and cost of operation, another agency can refuse to increase the price of the product or leisurely grant an arbitrary and inadequate increase based upon a guess as to the controlling cost factors, and that the owners will, nevertheless, finance, underwrite and accept the results."

Another outstanding assumption of various government officials throughout the course of events was that the industry would grant portal-to-portal pay. With the United Mine Workers previously on record in favor of face-to-face and court actions yet to be decided, it is difficult to see how such an assumption could have been justified, but nevertheless no federal official or agency proceeded on any other basis—another evidence of government's tendency at times toward blandly disregard of fact and established customs.

No one challenges the fact that a contract was and is the crux of the situation. In that, government was perfectly right. But how does government,

# What's Ahead in Coal Production and Distribution

THE DESTRUCTION of any complacency about our coal supply was one of the casualties of the second year of war. Our comfortable outlook in coal evaporated in a welter of mine wage and price arguments, strikes and local shortages.

It may be well that illusions about coal have been swept aside by events. It must now be clear to the entire coal industry and to coal consumers that hard and concentrated effort on the part of all those concerned, from the operator and miner on down to the smallest consumer, is necessary if we are to meet essential war and civilian needs.

It is easy to state in general terms what has happened. While consumption requirements for coal increased in 1943 at least 20,000,000 tons over the previous year, the coal industry (thanks to work stoppages which lost us potential production of more than 40,000,000 tons) has only produced about as much coal as it mined in 1942.

We would now be in the middle of a tragic coal shortage except for the foresight of those consumers who built up large stocks of coal during the relatively lush days of 1941 and 1942 when production was exceeding consumption. These stocks, combined with distribution controls, have enabled us to carry on through this period with much less disturbance to war production and civilian life than would have occurred otherwise.

Consumption requirements are still increasing, with the Nation's rising war production, but we may reasonably expect them to strike a position of equilibrium during the course of 1944. Production, also, may increase as a result of longer working time and the total produced during 1944 should be substantially larger than in 1943.

However, various factors, principally the shortages of manpower and equipment, put a definite ceiling on what may be expected from production. Other factors, including further loss of manpower, unreplaced depreciated machinery and the increasing average age of miners, may act to cause a production recession as the year advances.

On the basis of the best available information, bituminous coal consumption requirements (including exports) in this country will approximate 335,000,000 tons between Oct. 1, 1943, and April 1, 1944. For the similar six-months' period of 1942–43, bituminous coal consumption requirements totaled about 310,000,000 tons. In other words, we are consuming coal in the current half of the "coal year" at the rate of 50,000,000 tons annually above our consumption in the comparable six months last year.

The average weekly production of bituminous in this six-months' period would have had to reach nearly 13,000,000 tons to fully match these increased requirements. Actually, considering pre-strike output and the production losses during the strike, production would now have to be averaging over 13,600,000 tons weekly to compensate for those losses. It would be unreasonable to imagine that production can now be raised high enough per week, under present conditions, to produce all this coal. The difference between production and consumption will have to come from stockpiles.

For the coming year as a whole, estimates indicate that while requirements will be higher than in 1943 they will not average as much higher as present trends would suggest. Estimates for the calendar year 1944 place bituminous coal consumption requirements at more than 620,000,000 tons. Anthracite consumption requirements for the similar period are estimated at about 66,000,000 tons.

The difficulties involved in increasing production have already been suggested. Operators calculate that they are short about 56,000 men in the coal fields now and that the drain to the armed services and to other industries is continuing, although at diminishing rates. It is likely that there will be fewer men and that the average age of miners will be higher at the end of 1944 than it is now.

Mining machinery is depreciating at an accelerating rate as the longer hours of operation and double shifts put added strain and wear upon many already overage parts. An increased output of this equipment, which re-

or perhaps one should say, the New Deal government, look upon terms. Its attitude toward the June 18 decision of the War Labor Board, directing the signing of an agreement for the appalachian region, may be an inkling. The blunt fact is that the administration took no steps at all toward enforcing that decision. In fact, it might be said that it encouraged its burial and the negotiation of a new instrument more to Lewis' liking.

The U.S.-U.M.W. contract, as stated, was the result not of collective bargaining or any attempt to get the two parties together to work out an acceptable compromise but instead the result of sudden and arbitrary action. Since Roosevelt was willing to order it, there was no reason to believe that Lewis, who already had advertised it as the agreement for the industry, would be willing to accept anything else upon termination of seizure. In fact, that was his stand at the time this was written—a stand in which he was tacitly, if not openly, encouraged by various administration officials.

What are some of the implications of this U.S.-U.M.W. agreement, which Lewis immediately set to work to make the agreement for private operation? Among other things, it was justified as a means of increasing working time, largely by lengthening the shift, setting up an assumed travel time and subtracting 15 minutes from the lunch period. If more working time was desirable—and it is—logic would seem to indicate that it be specified, rather than left at the mercies of an assumption of travel time, although that, of course, would not have fitted in with the method being employed to impose portal-to-portal payment on the industry.

While Washington may not be, the coal industry is well aware of certain other effects of the portal-to-portal system set up in the U.S.-U.M.W. agreement. An outstanding one is the disruption of established competitive relationships. Under the U.S.-U.M.W. system, the mine with the higher travel time is penalized, either in a higher cost per ton through a reduction in working time or a substantial investment in new openings or other facilities for decreasing the time spent in getting to working places. At the same time, another mine, perhaps just across the railroad tracks, might enjoy a substantial cost advantage because travel time is relatively low.

The net effect, in any event, is a substantial increase in cost to the consumer. But that is not the only possibility of an increase in cost. It is difficult to believe that Lewis will be content with anything longer than a 7-hour day when normal times return, or that he will feel that 15 minutes is long enough for lunch. So, coal mining and the coal consumer can expect, as an outgrowth of administration policy in the present situation, demands necessitating a substantial further increase in cost when, after the war, Lewis opens his campaign for a 7-hour or shorter day—with, of course, no reduction in daily rates.

If a permanent increase in war production is achieved, however, it can be offered as at least an immediate ad-

## A Statement to *Coal Age* Readers by *Dr. CHARLES J. POTTER*

**Deputy Solid Fuels and Coal Mines Administrator**

quires large quantities of critically-short materials, has been scheduled for 1944. Even so, however, it cannot fill all needs and it is probable that many equipment requirements will continue to be unfilled. This is the second major factor limiting coal production.

Secretary Ickes has taken the sound position, in which I am fully in accord, that the coal industry can do the best and most efficient job under private management, and with a wage contract which assures peace between operators and labor. With such an agreement in effect, I am convinced that the industry will display more initiative and will produce more coal than would be possible with the mines in the government's possession, even though they were operated under the government-labor wage agreement. Incidentally, in the first full week of operation under the government-labor contract, production reached 12,700,000 tons, the highest weekly figure in more than 16 years.

All of us who have been connected with the government's take-over of the mines have sincerely hoped that they could be returned to their owners as rapidly as possible. Because of our firm conviction that the coal industry can carry on its business better than anyone else, we have taken the position and maintained it throughout this period that governmental supervision of the mines would be exercised only to the extent necessary to obtain the fullest possible production.

While we believe that the best production will be secured under private operation and with labor peace, in view of the increased requirements and the limitations upon output it is doubtful whether there is any hope that enough coal will be produced during the remainder of the war period to meet all requirements.

A continuing discrepancy between total requirements and total production will call for the exercise of greater conservation in the use of coal, in the elimination of heat wastage and in the reduction of many non-essential uses of coal.

Above all, it will be requisite that governmental controls over distribution be continued to make certain that the coal which is available will be channeled to meet essential war and civilian requirements. The extent and type of these will be conditioned on the availability of supply of the various types of coal in the different consuming areas.

War and events have determined our course. It is the job of all to see that everything is done which must be done to fill the Nation's needs for coal in this trying period. Real effort on the part of the coal industry in getting out the maximum possible tonnage under present conditions and in endeavoring to see, in conjunction with the government, that it is equitably distributed to the most essential users will enable us to do our part in assuring that the war effort is not hampered by lack of coal.

**Production and distribution his job: Dr. Charles J. Potter, new deputy Solid Fuels and Coal Mines Administrator.**

★ ★ ★

vantage of the contract, despite its long-term implications which the industry, by increased investment to promote efficiency, may be able to offset in part. And if the industry could settle down to produce coal with the assurance of a reasonable return for its efforts still another major benefit will have resulted. Production still remains the No. 1 problem, and will continue so when Seizure No. 2 terminates, whether by action of the 60-day clause of the War Labor Disputes Act or, as Secretary Ickes has announced, the signing of an agreement. Pending such termination, and with the contract signed, government activity in the present seizure, as outlined on p. 59, differs little from that in Seizure No. 1.

### SFA and the Future

With production, distribution also remains a problem as a result of the tonnage losses growing out of the work stoppages earlier in the year. Both activities are the prime jobs of the Solid Fuels Administration for War. While its record went by the boards when Lewis opened up last March, this agency and its predecessors had operated up to that time without issuing a single order, directive or regulation. "What about its future course?" might be the next logical question. If past actions and the opinions of its new deputy administrator, Dr. Charles J. Potter, are any criterion, SFA will follow its original plan of a minimum of regulations and orders in the future.

Holding also the position of deputy coal mines administrator, Dr. Potter brings to his job an understanding of coal problems gained through experience in the industry. A native of Greenfield, Mo., he graduated from Missouri School of Mines with degrees of Batchelor of Science in 1929 and Master of Science in 1930. In 1932, he earned a Ph.D. at West Virginia University, afterward joining the staff of Bituminous Coal Producers Board No. 3, Fairmont, W. Va., and then going with the Continental Coal Co.

He was appointed assistant chief of the marketing branch of the Bituminous Coal Division in 1938 and was responsible for much of the task of coordinating minimum coal prices. In October, 1940, he resigned from government service to become assistant to the president of the Rochester & Pittsburgh Coal Co., Indiana, Pa., later returning as consultant to the solid fuels coordinator. This was followed by appointment as chief of distribution and assistant deputy solid fuels administrator.

Although charged with one of the nation's most important and complicated war jobs at the age of 35, Dr. Potter gives no sign that he has anything but a thorough grasp of his responsibilities. Impatient with certain policies and beliefs held by the coal industry, he also gives coal operators full credit for the job they have done and sympathizes with them in the unhappy series of events to which they have been subjected. That jibes with his conviction that men who exercise control over an industry should know something about it. His experience backs up the conclusion that he is no theorist, despite the combination of Ph.D. and a government job. He is a Ph.D. because he earned it, an administration appointee by circumstances and in wartime Washington because there is a job to be done and he is trying to do it. He admits to a wholesome respect for Lewis' abilities and an admiration of Ickes, along with a conviction that coal operators have oversold themselves on their ability to produce under the conditions inevitably resulting from war exigencies.

A smooth, easy and informal talker, Dr. Potter is there with quick and ready answers. And he doesn't dodge questions. With Ickes, he is against nationalization and, like Ickes, he vows that his desire is to get rid of the task of operating the coal mines just as soon as possible. His job, as he sees it, is production and distribution, and he is ready to do battle with any other government or private agency whose actions might tend to hold up the speedy attainment of those goals.

But Solid Fuels and its administrators, however able, cannot end the confusion that attends the handling of various aspects of wartime government control of coal mining by a multitude of government agencies, bureaus and officials, especially when operating under the aforesaid sweeping and ill-defined powers with their inherent invitation to sudden and arbitrary action. Assuming that such controls are necessary while a war is being fought, although there still is no evidence that they are desirable in peacetime, it is logical to assume also that centralization would help, even though this still would be no real guarantee against arbitrary action for the sake of politics or expediency.

To repeat, the exercise of wartime coal controls, with a very few notable exceptions, is no advertisement for the adoption of these and even stronger controls in peacetime. Confusion, division of authority and summary measures, in fact, likewise confuse and divide industry, hampering it in its attempts to promote unity, increase efficiency and serve the consumer—all too often forgotten when government takes a hand—more economically.

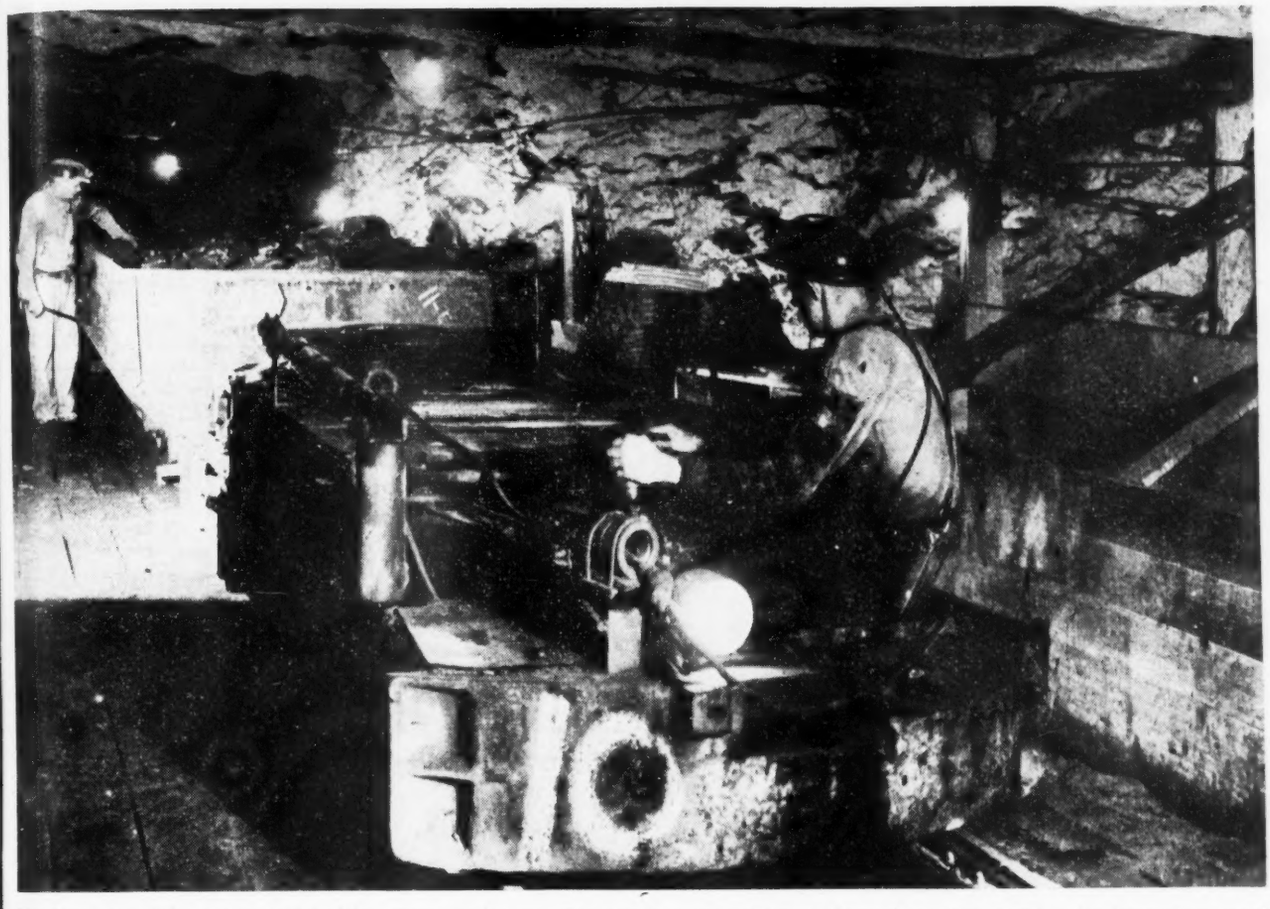
Whether the cause of government in business will be as popular after the war is yet a matter of the future. But it cannot be assumed that its supporters will give up easily. Therein lies a challenge which no industry can afford to ignore, and that includes coal mining. It and every man in it has a stake in freedom of enterprise. The longer government control continues and the stronger it grows the greater the hazard to the interests of the industry, its employees and its customers. Action now, or at the earliest possible opportunity, is the key to preservation of this freedom of enterprise.

What can industry do to preserve its freedom? What can coal do? Boiling everything down, the answer is: everything required to make government control unnecessary. While simply stated, it is by no means a simple job. It requires work and study to develop policy and program, and leadership to put them into effect. Controls of various kinds will continue as long as the war lasts, but producing to the limit, cooperating to insure the best possible distribution, and promoting conservation and efficient utilization will operate to reduce the number necessary as well as their scope.

### Coal Mining's Job

Production, as always, will be a prime consideration also in that peacetime to come, but with this difference: it will have to be more efficient production than ever before to offset higher costs now imposed or in prospect and thus enable coal mining to take full advantage of its undeniably bright future. But other problems will be equally important with production, notably relations with employees and with the public. To handle them properly and head off possible attempts to continue present controls or impose new ones, coal mining must perfect its organization and program for direct, unified action for the benefit of its stockholders, its employees, its customers and the public in general.

The charge that the coal industry cannot or will not get together, it must be admitted, has been all too true at times in the past. But that is no sign that it need be true in the future. Uniting on a common program and then standing behind it may require compromises, perhaps on a major scale, but if they enable the industry to function more efficiently in its relations with its employees and the public and thus remove any excuse for government controls, such compromises will be well worth the cost. Making its leadership effective is a real job for coal mining in the future—in fact, the immediate future.



The level top of the station is 6 ft. 5 in. above the bottom. Car stands over section of dump bin. Box right is for locomotive sand.

# TRANSFER CARS

## Boost Section Tonnage 1/3 at Powhatan

### Twenty 6-Ton Cars Serve Four Loading Machines, Raising Tonnage One-Third—Ramp and Dump Bin Are a Sectionalized Recoverable Unit 277 Ft. Long—Top Taken to Install—Coal Dust Controlled

*By J. H. EDWARDS*
**Associate Editor, Coal Age**

MOBILE loading tonnage per man-shift on the section at Powhatan mine, in eastern Ohio, has been increased a third by installation of 6-ton drop-bottom loader-service cars from which the coal is transferred to existing mine cars of 2.2 tons capacity. Being a shaft but with a skip hoist, the mine could accommodate larger cars for the entire haulage without changes to the shaft but instead of waiting until after the war thus to completely replace the car equipment, the company chose this transfer method and has achieved excellent results.

Instead of an excavation for the dump bin, top is taken to accommodate a transfer station consisting of a wooden bin with ramp approaches so locomotives can pull the large cars over the top of the bin. Bin and ramps, built of wood, are in bolted sections to permit recovery and to facilitate moving to the next location. They were built and assembled on the outside, then dismantled and moved into the mine.

This operation of the Powhatan Mining Co. is the largest in Ohio. Normal production was 7,500 tons per day, but labor shortage has cut the output to 6,500. The mine is in Belmont County and, although the shaft is within a few hundred feet of the Ohio River, it loads only to the rail-

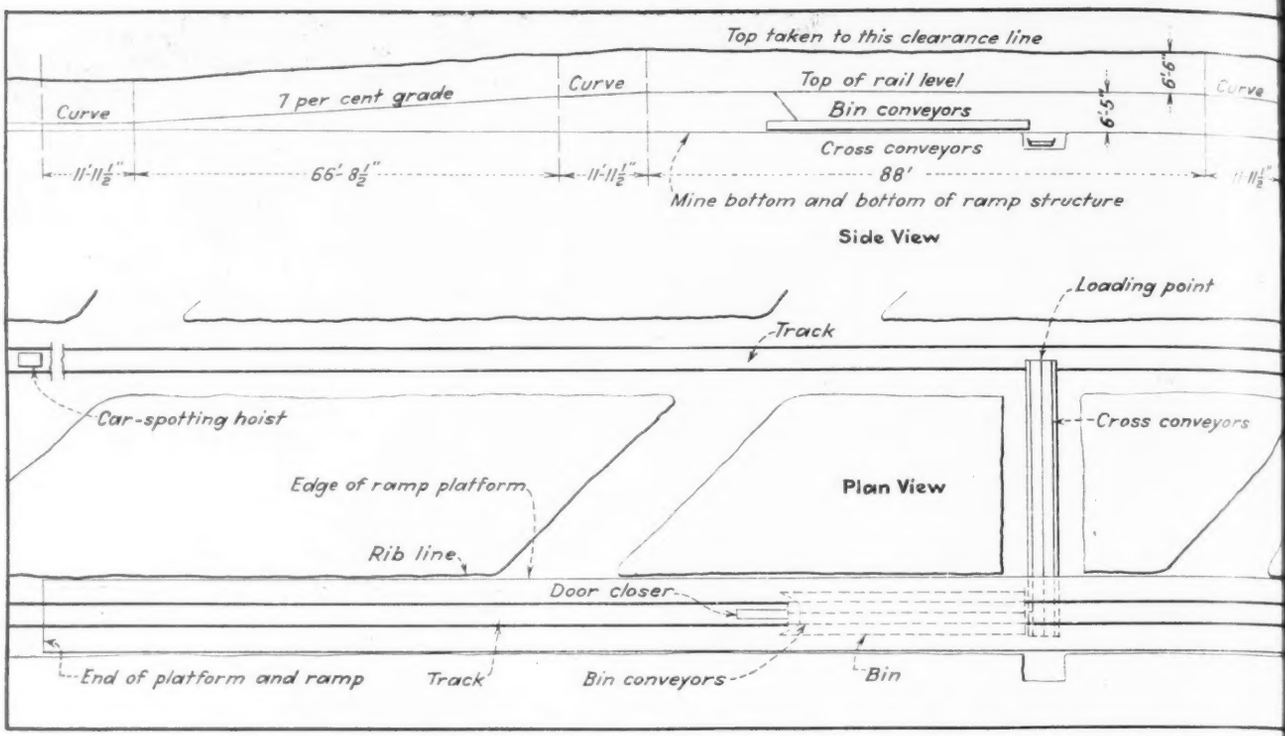



Fig. 1—General layout of the recoverable transfer station used at Powhatan.

road, a branch line of the Pennsylvania system. Control of the Powhatan company is under the North American Coal Corp., of which A. J. Ruffini, of Cleveland, is vice president in charge of coal operations. Roy W. Fox is mine superintendent; Charles Young, assistant superintendent; David Elerick, general mine foreman; George J. Mitchell, chief engineer; A. D. Swecher, safety engineer; Mathew Speicher, personnel director; Felix McParland, general outside foreman; Charles Neff, chief electrician, and H. P. Dickson, master mechanic.

Mining is in the Pittsburgh No. 8 seam, of which an average of 5 ft. is recovered. In narrow work a stratum up to 12 in. thick of shale or drawslate (or "stone," a local term) is taken down, exposing a rooster coal which makes a fair top. Vertical clay veins are encountered which penetrate through the seam. They vary from a few inches to several feet in thickness and often give off considerable gas.

All mining is mechanical and the equipment is as follows: 29 Jeffrey 35BB shortwall cutters, three Jeffrey 29U arcwall cutters (both shortwalls and arcwalls have 9-ft. bars on which standard Borod-tipped bits are used), seven Jeffrey L-400 loaders, four Joy 14BU loaders, two Joy 7BU loaders, one Joy 8BU loader, ten Goodman G20 duckbills delivering to a 30-in. Goodman belt and the same number of G15 duckbills delivering to a similar belt.

Of the 14 loading machines, ten work in coal, one loads stone and three are in the shop normally undergoing repairs and rebuilding. Six of the loaders (one Jeffrey and five Joy) work on the development for duckbill sections and the remaining four are on the section using the large transfer cars delivering to the ramp station. Here a 14BU and an L-400 drive narrow work and another pair of these two types work rooms. In the wide work of both panels of this ramp section the coal is top cut, leaving 3 in. of bone coal under the drawslate. In the narrow work, where the bone coal and stone are taken down, the seam is undercut.

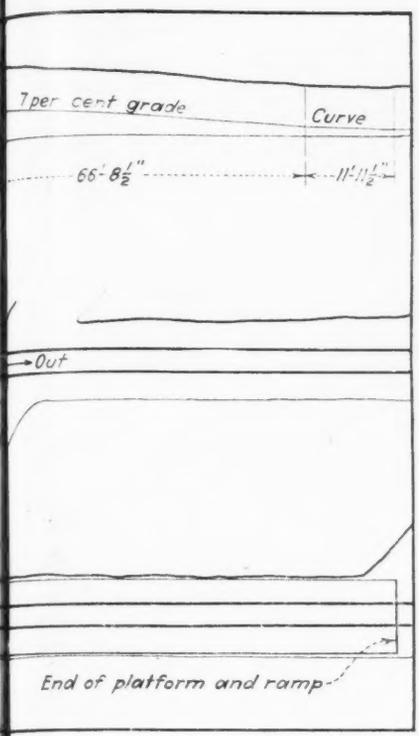
Twenty Sanford-Day 6-ton "Automatics" of the 1-2-3 drop-bottom type constitute the car-service equipment for the four loading machines in the ramp section. These cars have been in service since July, 1942, and in the first set-up were dumped on an experimental wooden ramp which was built in place and not recovered (except as lumber) when the section was finished. At the time of this writing about half of the second section served by the sectional and recoverable ramp and bin had been mined.

The cars, 42-in. gage, 48-in. wheelbase, on 16-in. chilled cast-iron wheels with Timken bearings, are 14 ft. 4¾ in. long over the bumpers, 6½ ft. wide and stand 44 in. above the rail. Water-level capacity is 217.6 cu.ft. and the capacity, 6-in. surcharge, is 257.6 cu.ft.

In wide work two locomotives each pulling three cars serve each loader; thus in this class of work twelve of the cars are in use. In narrow work, where one cut usually produces four carloads, one locomotive is used per loader and the usual trips are made up of four cars. While one trip is being dumped at the ramp station another trip is being loaded. At times, however, these narrow-work trips are made up of three or five cars.

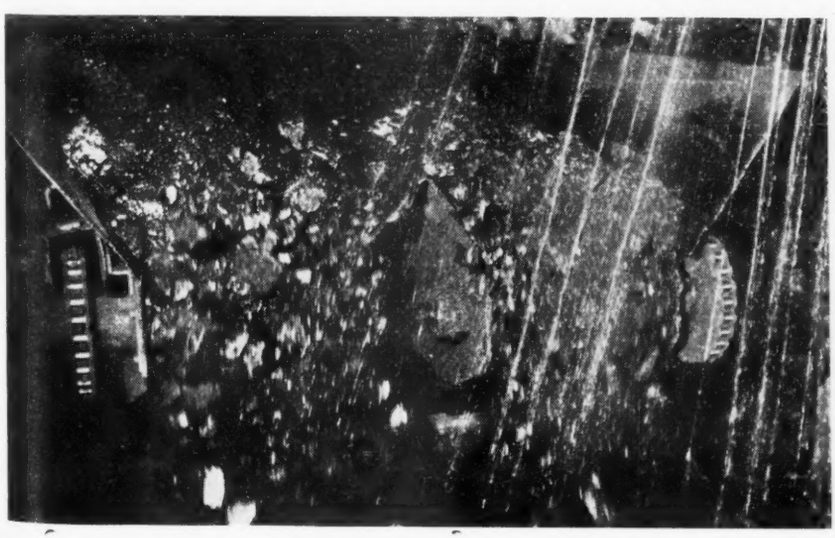
Service locomotives, six in number, are 6-ton Westinghouse 904C cable-reel units. The ramp and dump-bin structure must normally accommodate these and their trips, also the passage of the loaders, of which the L-400 is the heaviest. The design is strong enough, however, to allow a 12-ton locomotive to pass over it if necessary. Of the total length, 277 ft. 3 in., a level section at the top, 6½ ft. above the mine bottom, constitutes 88 ft. Straight sections of the ramps, on 7-percent grades, are each 66 ft. 8½ in. long and the four curves making the connections at top and bottom are each 13 ft. 11½ in.

Four Jeffrey 61EH chain conveyors 42 ft. long and driven by d.c. motors constitute the machinery of the transfer station. Two of these conveyors, used side by side, are installed horizontally in the bottom of the dump bin. They feed to the other two, also in parallel, taking off at 90 deg. and termed the cross-conveyor unit. These elevate through a breakthrough to the



loading point on the adjacent haulway. Trips of mine cars are spotted by a Brown-Fayro hoist driven by a Westinghouse 10-hp. 250-volt d.c. motor installed at the end of the inby empty track. The anchorage and bumper protection for this hoist is described on p. 92 of this issue.

The ramp is built of untreated oak and the largest sections are the bents supporting the level part. These are 10 ft. wide and 6 ft. high. Thickness is 12 in. and when laid flat one on top of another, three can be transported per car. Bents are 4 ft. apart for the 42-ft. length of the dump bin and 8 ft. apart throughout the remainder of the structure. Stringers are



Top

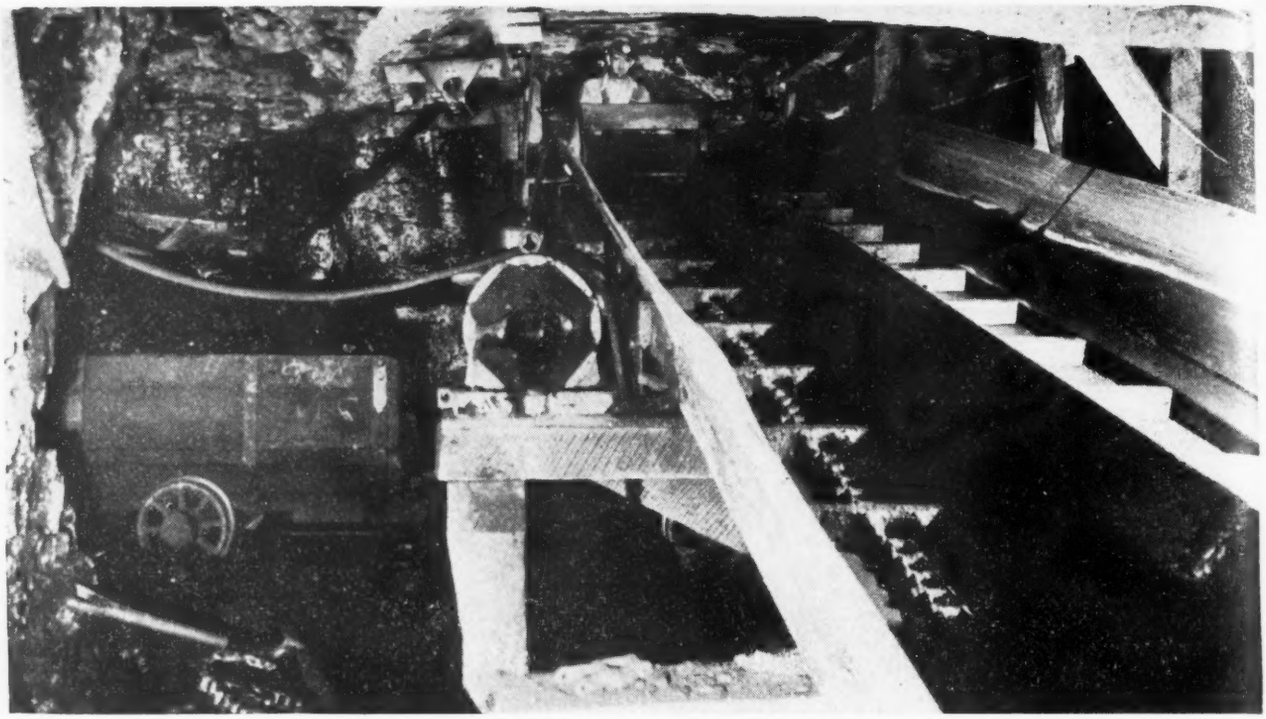
View under the ramp looking inby along one rib. Here the bents are 8 ft. apart and every other crossbar, or joist, extends from rib to rib to support planking.

Above

Another view of the ramp bin—from the back end. Because their width does not allow them to be installed directly opposite, the tail section of only one of the two parallel conveyors shows.

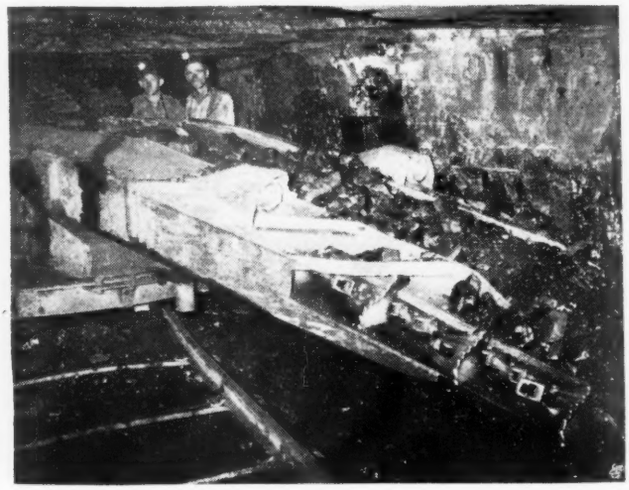
Left

Car trimmer's view of the loading head during operation. The diagonal streaks are water turned on when it was noted that previous spraying in the dump had not been sufficient to completely control the dust.



**Looking up the cross conveyors to the car trimmer on his control platform. At the left is a loaded mine car.**

**Retrackers used with the big cars in place on the rail ends.**



**Track-mounted loader starting work at the corner of a room.**

7x9 in. and the crossbars or joists 5x7 in. Every other joist reaches from rib to rib to support a floor of planking so that the top of the structure can be used as a material depot as well as for coal dumping. Rail weight over the ramp is 60 lb.

Instead of the transfer cars being dumped automatically their doors are tripped by a dumper whose job it is to see that before another car is dumped the conveyor has partially emptied the bin. Filling the bin from end to end would cause maintenance difficulties on the horizontal conveyors. Water sprays in the bin are turned on during dumping and if the car trimmer at the loading point notes that any dust remains he turns on other sprays at the mine car.

Absence of coal dust is notable at the transfer station. The allaying begins at the face, where water is applied to the cutter bars. In this ramp section and in other loading-machine sections the water is piped to the face. The type of tank used on the shortwall machines in sections not piped is described on p. 98 of this issue.

As already mentioned, the platform of the ramp serves as a supply station or depot. There the supply crew unloads repair parts, bits, tools, rock dust, sand and so on. Between trips the dumper makes dummies and helps handle other supplies. The motor crews handling the transfer cars take the supplies to the face, including water for filling the cutting-machine tanks. It is handled in 5-gal. cans which the dumper fills from the water lines at the station. The maintenance shop for the section is within 100 ft. of the outby end of the ramp, which makes the transfer station the true center of all activities on the section.

Bone and stone from narrow work also are handled by the large cars and put into mine cars via the transfer station. It is not required that the bin be completely emptied of coal before a car of stone is dumped. All that is necessary is a clear space of car length at the back or inby end of the bin.

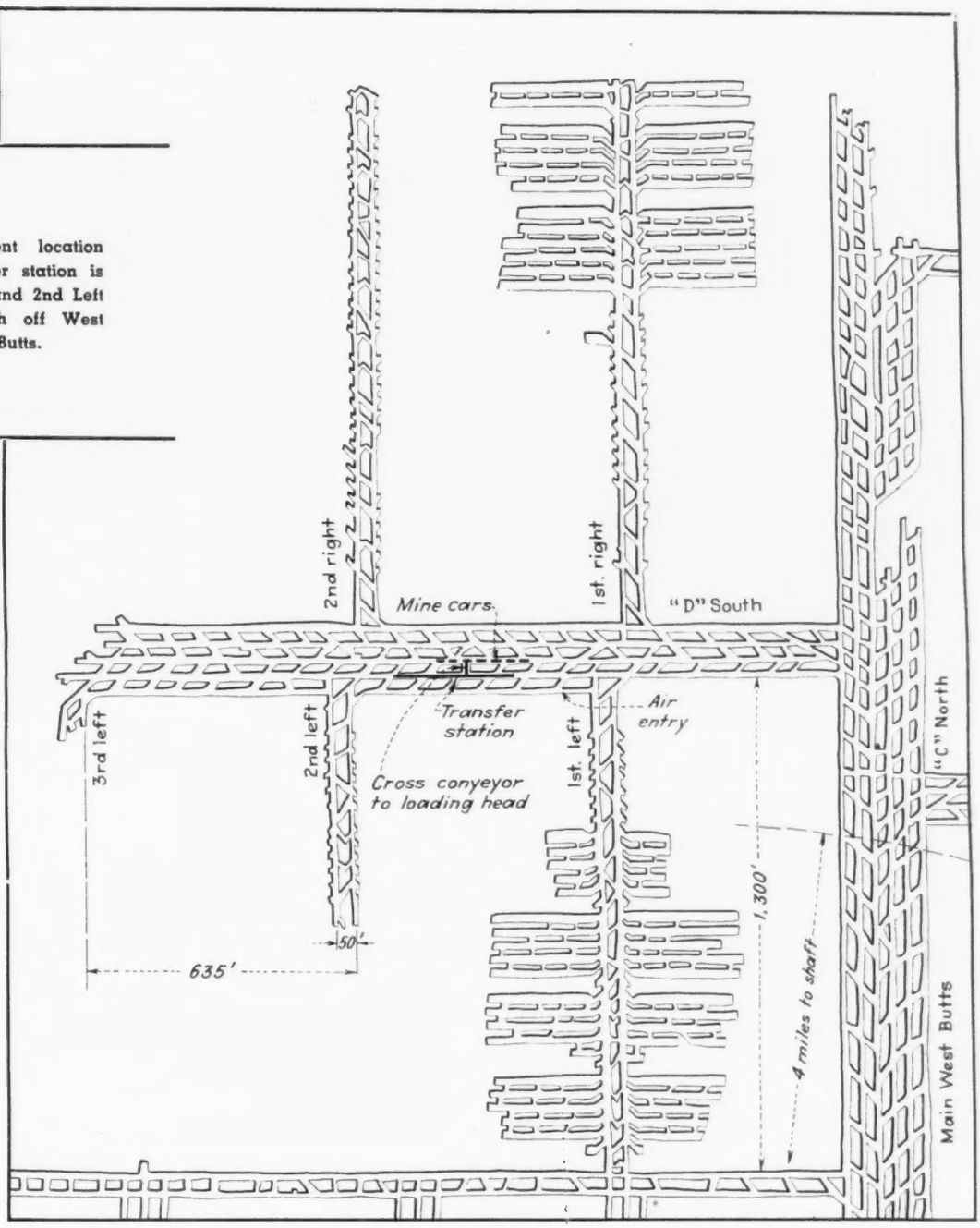



**Fig. 2—Present location of the transfer station is between 1st and 2nd Left on "D" South off West Main Butts.**

Fig. 2 shows the ramp location and the state of mining and development in the section when the photographs were made. Total tonnage to be handled over this set-up is estimated at 542,730. It includes the four panels of rooms and the development inby the ramp to 5th Left ready for working from another set-up between 4th and 5th Left and from which set-up it is planned to mine six panels instead of four. Another section and recoverable ramp has been built and will be installed there ready to take over without delay when mining at the present ramp is finished. It is intended to limit transfer-car hauls to 2,500 ft.

Rooms are driven 22 ft. wide and 300 ft. deep on 35-ft. centers. A panel of rooms works a territory 700x1,100 ft., which at 60 percent recovery yields over 90,000 tons. Rooms are worked on the coal faces and the room entries on the butts. Room entries, marked Lefts and Rights on the map, are spaced on 635-ft. centers and the individual butts of an entry on 50-ft. centers.

### Retrackers Used at Face

At the face in the rooms the roof is controlled by steel jacks, both Simplex and Duff-Norton being used. Transfer cars are run off the end of the track and onto the mine bottom at the faces worked by crawler-mounted loaders. Retrackers are carried with the loading machines and are slipped over the ends of the rails to guide the wheels back onto the rail when the loaded cars are pulled. They are arc-welded construction and consist of ½-in. plates, 12 in. wide at the back, 19 in. at the front, 21 in. long, fitted with flange guides on top and slots and blocks at the rear to fit over the rail base and flange.

The ramp section, like the rest of the mine, is worked three shifts, six days per week. Main haulage from the transfer station to the shaft bottom is over four miles. The ¼x8-in. fraction of the output is washed in Chance sand-flotation equipment.

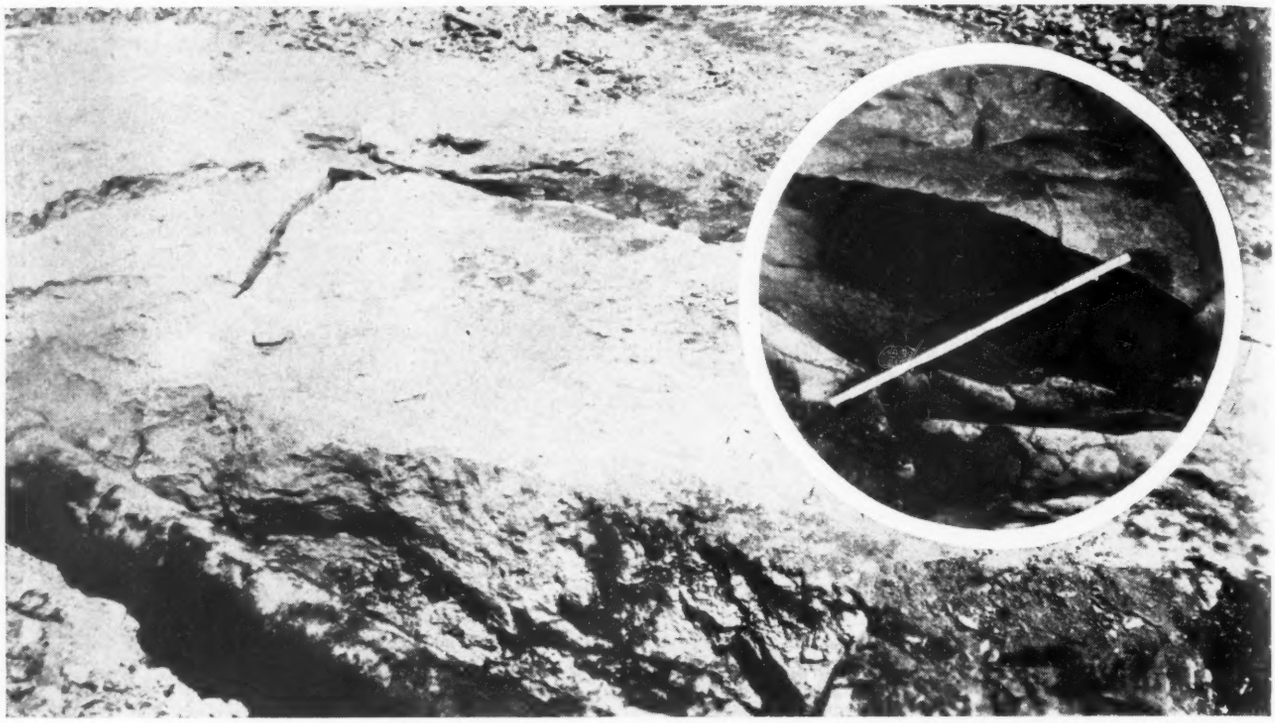


Fig. 1—Nature of the cracks and character of the stream bed at point where sealing was done.

# STREAM-BED CRACKS

## Sealed to Keep Water Out of Workings*

Coal Removal Increases Problem of Seepage Into Mines—Preventing Inflow, if Possible, Preferable to Pumping — Sealing Cracks in Stream Bed Got Results at One Colliery of the Hudson Coal Co.

*By CHARLES J. GOLDEN and VAUGHAN H. WILSON*
The Hudson Coal Co.
Scranton, Pa.

IF FIGURES on run-off after rainfall in the anthracite region were assembled on a percentage basis, they undoubtedly would indicate a less-than-normal rate compared to any other territory with equal rainfall. The main reason for this decrease is the disturbance of the rock strata caused by the robbing of the underlying beds resulting in cracks and fissures which form direct inlets for the water into the workings. These cracks are generally hidden to observation, except where the rock is exposed or when the surface is of a clay nature, in which case cracks and crevices of various thickness are evident. The surface water inflow to the mines from this source steadily increases as the removal and exhaustion of coal proceeds.

Starting in a small way and at first countered with individual pumping plants of modest capacity, the problem has so grown in magnitude and importance as to demand a major share of engineering attention and has led, as the years passed, to progressively larger pumping plants, enormous underground storage reservoirs, combined inter-colliery and inter-company pumping operations, and the control of drainage systems over many square miles of surface and underground coal areas.

Engineers have always recognized that prevention is better than cure—that keeping water on the surface is preferable to allowing it to get into the mines inasmuch as the cost of handling mine water increases immediately in a ratio related to volume and depth. But it has been impossible to follow this principle to a marked degree since such inflow into the mines is primarily by seepage over vast areas, and for that reason is difficult to control economically on the surface, while the removal of water from the mines is by thousands of gallons at points where an investment could be predicted as having a reasonable return.

Occasionally, however, it is possible to undertake an economical preventive

* Paper presented before the Anthracite Section, American Institute of Mining and Metallurgical Engineers; published by special permission of the society.

measure over a restricted area. The work recently done on the floor of Mill Creek at The Hudson Coal Co's. Delaware Colliery, in Plains Township, is an attempt in this direction and the conditions exposed during the performance of the work illustrated the manner in which water passes from the surface to the workings.

The area of the creek given attention was part of a new section of channel constructed in 1940, under which there are five beds, viz: Checker, Top Ross, Ross, Three Foot and Red Ash, with the Checker, Top Ross and Ross outcropping in the bed of the channel. All of the beds except the Top Ross and Red Ash have been robbed in this area.

The reason for constructing this new section of channel was to permit the orderly robbing of beds beneath the original channel, under which mining in the Checker and Ross Beds had been carried to a point where the cover was so thin that seepage to the mines, calculated from flow meter readings taken at various times between 1937 and 1939, averaged about 500 g.p.m.

The new channel functioned satisfactorily until the flood of May 22, 1942, during which the creek bed was eroded by extreme high water to a depth varying from 1 to 3 ft., with the result that a large volume of water found its way into the mine from the section overlying the crop of the Checker Bed.

After studying the situation, a plan was agreed upon for correcting the conditions found in the affected section of the creek bed, involving a distance of about 400 ft. directly over the Checker Bed crop where the width of the bottom of the channel is approximately 40 ft. The plan contemplated the removal of sand and gravel from the creek bed to a depth of 5 ft., and replacing this material with 4 ft. of blue clay on top of which 1 ft. of coarse gravel was to be spread for the wearing surface.

Due to the nature of the work and to prevent as far as possible any embarrassment from an excessive inflow of water, the latter part of July and the month of August, which period, it was believed, would be relatively dry, was selected as the proper time to do the job.

There are three reservoirs up-stream on the Mill Creek watershed, and to safeguard against a sudden rush of water during the time this work was under way, the Scranton-Spring Brook Water Service Co. was requested to eliminate, by diversion, as much water as possible from the Mill Creek channel. It cooperated to the fullest extent by utilizing its water canal farther up-stream to divert the water from the Mill Creek watershed to Laurel Run Basin. As a further precaution against flash floods interfering with the proposed work, the old creek channel was temporarily reopened and the upper end of the new channel was blocked off. As a result of the combination of the above precautions and generally fair weather, we had little interference from water during the progress of the job.

The work of removing the surface from the affected area of the creek bed was begun at the up-stream end after a ramp had been cut through the southerly bank of the channel so that the excavated material could be hauled away. Three medium sized trucks, a 1½-cu. yd. power shovel and a No. 40 bulldozer were used in removing the sand and gravel. To maintain a channel of adequate capacity to carry any water which might result from rainfall while the job was being performed, one-half of the width of the channel, approximately 20 ft., was completed first.

When the work had advanced about 170 ft. down-stream the rock over the Checker Bed was encountered and exposed in the form of a ledge, the surface of which pitches down-stream. Along the edge of this rock face and under the floor of the creek a 16-in. water main of the Scranton-Spring Brook Water Service Co. crosses the channel.

As the rock beneath the floor of the channel was exposed by the removal of sand and gravel, it was found to extend 120 ft. down-stream before dipping to an elevation below that of our proposed excavation of 5 ft. It also was found to be badly cracked. As the rock is of a hard sandstone nature, the cracks and crevices proved to be fairly regular in width but very irregular as to direction. One crack was 16 in. wide but the others varied in width from ½ to 3 in. and appeared to extend through the total thickness of the rock overlying the Checker Bed. However, a few of the crevices were filled, and some others partially filled, with sand and gravel. Fig. 2 depicts the area ultimately exposed, likewise illustrating the location and direction of the rock cracks discovered. Fig. 1 shows the width of the cracks and the character of the stream bed

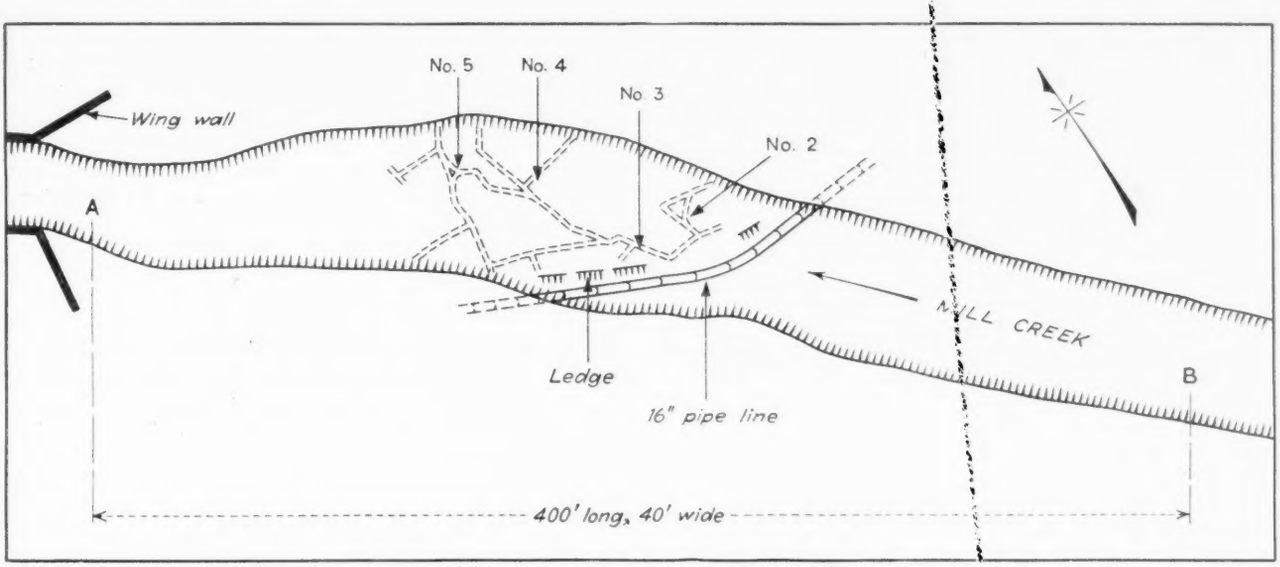
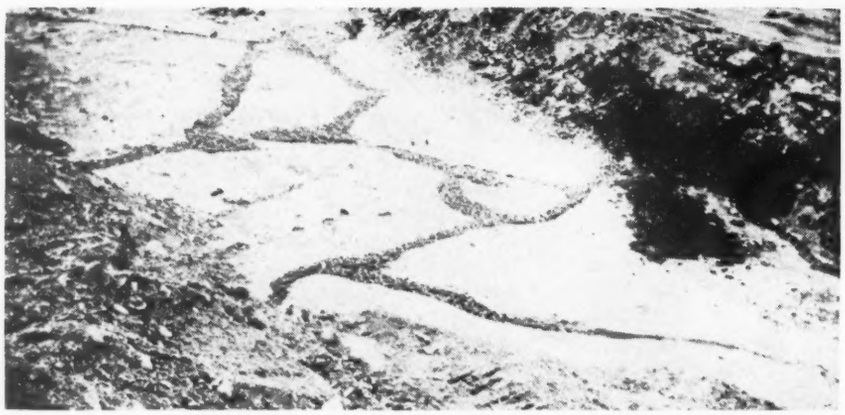
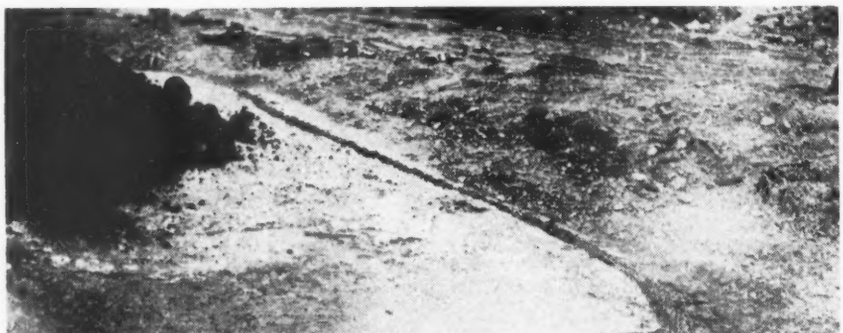



Fig. 2—Area involved in Mill Creek stream-bed sealing operations.





**Figs. 3 and 4—Cracks after sealing with bituminous material and before final application of blue clay.**

at the place these openings appeared.

The discovery of this condition in the stream bed rock brought about the need for filling the cracks with substantial and impervious material, since merely covering them with a layer of blue clay would still have made it possible for the water in the stream to erode and wash out the clay bottom and eventually reach the mines. Due to the possibility of some future disturbance to the strata in this immediate location it was decided to seal the cracks with a flexible waterproofing material.

As the rock was exposed it was swept thoroughly with a broom. The cracks and crevices were cleaned out with an iron scraper provided with a sharp pointed hook on one end and a flat one on the other which permitted the removal of small stones, sand and other small material. After allowing the cracks and crevices to become thoroughly dry, they were carefully filled to within 12 in. of the top with dry sand and other fine material, on top of which a 2-in. layer of oakum and cotton waste was packed.

A cold mixture of Tarvia and Class 1-B (buckwheat-size) crushed stone was then prepared and placed in the cracks, all of the stones being thoroughly covered with Tarvia. In order to assure a satisfactory bind, a man was continuously employed tamping the material in the crevices, and when the mixture reached the top of the crack it was allowed to lap over from 2 to 3 in. on each side. Figs. 3 and 4 show how this part of the work appeared when completed.

Where the 16-in. line of the water company was encountered, all material was removed by hand labor from around and under the pipe. The cracks and crevices around the pipe, caused by subsidence, as well as any that may have resulted from blasting when the pipe was laid, also were cleaned and patched with a mixture of Tarvia and stone, after which blue clay was tamped around the pipe with flat shovels. After the fissures in the bed rock had been sealed, a covering of blue clay, ranging from 18 in. to 4 ft. in thickness, was placed over the rock on top of which a layer of coarse sand and gravel was spread. The variation in the depth of the clay was due to the pitch of the rock.

In the areas where the bed rock was not encountered the original plan of excavating 5 ft. of sand and gravel from the channel and replacing it with 4 ft. of blue clay and 1 ft. of coarse gravel for wear was allowed.

The blue clay, hauled from a nearby stripping, was distributed and spread in layers about 12 in. thick by the bulldozer and was thoroughly packed by the same machine as well as by the loaded trucks running over it. Furthermore, a layer of blue clay of substantial thickness was spread and packed by the bulldozer on the slope of the side banks to an elevation above the normal flow line of the creek.

## Dam Completes Job

After the whole area had been covered with blue clay and heavy gravel, rolled and graded, an inexpensive stone dam, 12 in. to 15 in. in height was placed across the channel about 60 ft. downstream from the rock ledge. This was done to prevent the blue clay from being eroded and washed off the top of the rock ledge and to permit the creek to deposit sand and gravel behind the dam, thereby increasing the depth of material over the rock ledge and thus adding further protection to the impervious material.

Based on observations since the work was completed, we are convinced that under normal stream conditions the creek bed is now impervious to water. We have not yet had experience under abnormal water conditions and consequently there has been no opportunity to determine what effect excessive high water will have on the improved creek bed.

In conclusion, it is our opinion that this method of sealing stream beds, where feasible, has many advantages over the use of cement or various types of flumes. The blue clay has rubber-like properties, and Tarvia, being flexible, can contract or expand with disturbances in the rock caused by underground movements or temperature changes, while cement would crack, deteriorate and wash away. The more rigid types of stream protection facilities, i.e., flumes of wood, stone or concrete construction, are much more expensive to install and, when installed, are costly to maintain. They are affected by frost or dry weather, depending upon the material used in their construction and, in some cases, by excessively high water. At times they are cracked and broken by underground movements, or damaged by large stones and other material carried downstream by the water during flood periods.

The authors take this opportunity to express their appreciation to J. F. K. Brown, assistant general manager-engineer; H. H. Otto, mining engineer, and J. Fred Lewert, engineer, of The Hudson Coal Co., for their assistance in the preparation of this paper.

# HIGH TONNAGE
## Yielded by Bridgeport Outcrop Stripping

Using 3-Yd. Stripping Shovel and 1½-Yd. Loader, New Bridgeport Outcrop Operation Averages 11,000 Tons Weekly From 8- to 9-St. Coal—Plant Served by Railroad Tipple—Haulage Work Stressed

OUTCROP STRIPPING is being called upon for a larger and larger share of the eastern coal output since it is a means of quickly adding to capacity with a minimum of equipment and manpower. Consequently, deep mining companies in such areas as Northern West Virginia are opening more and more outcrop strippings, sometimes with equipment purchased for the purpose, more often, however, contracting the work to independent stripping organizations or contractors. Alongside them are additional pits opened by men and companies long engaged in outcrop stripping in other fields, some selling to existing tipples and others erecting their own preparation plants.

An example of the latter is the Fairpoint Construction Co., headed by R. W. Moore, prominent for several years in stripping in the No. 8 field of eastern Ohio, both as an independent operator and as a contractor for other companies, such as the Hanna Coal Co. Fairpoint began construction of a new mine near Bridgeport, W. Va., some 3 miles out of Clarksburg, in December, 1942, moving in a complete stripping unit (shovels and auxiliaries) from Ohio. The mine is served by its own tipple, designed by Mr. Moore and built by Clyde Shrum, general contractor, of Clarksburg. Shipments, over the Baltimore & Ohio R. R., began June 9, 1943, and now average 11,000 tons weekly. Ivan Poling, superintendent, also handled construction.

3-cu.yd. stripping shovel removing the bank at Bridgeport mine.

Loading coal at Bridgeport. Seam thickness at this point is about 9 ft. The vertical-auger coal drill appears at the lower left.

Bridgeport mine is stripping the Pittsburgh seam running 8 to 9 ft. thick in that locality. The rider usually accompanying the seam is absent or separated from the main seam by only a thin parting. Underneath the coal is the usual fireclay and over it the usual drawslate, shales and other strata normally found above the Pittsburgh bed.

As is general in strippings of this type, operations start near the out-

**Dumping ramp at the tipple. Trucks back up the ramp from scales off to the right and turn to the left coming off empty.**

**Three-track preparation plant, with the mine-run bin on the slope at the right.**

crop and work back until the depth exceeds that which the shovel can handle economically—normally not over 40 to 45 ft. The average at Bridgeport is about 25 ft. Hard material varies from a few feet at the outcrop to 25 to 30 ft. in banks of 40 to 45 ft., the remainder being the usual clay and surface material.

The stripping shovel at Bridgeport is a Lima 1201 diesel machine with 42-ft. boom, 35-ft. sticks and 3-cu.yd. Pettibone-Mulliken dipper. Average output of this shovel is 250 cu.yd. per hour. Average diesel-fuel consumption is 11 gal. per hour.

In opening up, this shovel can make a cut 60 ft. or more wide to show up drainage channels, block out merchantable coal and otherwise set the pattern for succeeding cuts. These succeeding cuts normally are 40 to 45 ft. wide. To assist the shovel, especially in wide cuts or deeper overburden, a D-8 Caterpillar tractor with La Plant-Choate bulldozer and one International TD-14 and two TD-18's with Bucyrus-Erie blades, are available for use on top of the spoil pile. These units shove the spoil back and level it off.

In the higher banks, usually where the hard material is 12 ft. or more thick, the overburden is drilled by a "Parmanco" gasoline-powered drill making 6-in. holes. Hole spacing, depending upon height of bank and thickness of the hard material, is 12 to 18 ft. with cuts 40 to 45 ft. wide. Usual spacing is 16 ft. The explosive is 5½x16-in. "Apcor" No. 1 or "Apex" No. 2. Charge per hole is 85 to 100 lb. making the average yield about 10 cu.yd. per pound.

In preparation for loading, the coal is first cleaned by a Bucyrus-Erie bulldozer on an International TD-14 tractor. Hand shovels and brooms complete the job. Before leveling, the coal is shot lightly with 1½-8-in. Apex pellet powder. Holes are put down with a rubber-tired gasoline-powered "Parmanco" vertical drill.

The loading shovel at Bridgeport, also used for stripping on occasions, is a Lorain 80 machine with 30½-ft. boom, 25-ft. stick and 1½-cu.yd. "Amsco" dipper. Its capacity under normal conditions is 175 to 200 tons per hour, and it normally operates 8 or 9 hours for the usual daily tonnage.

Haulage at Bridgeport is contracted on a tonnage basis, the contractors normally operating 1½- to 2-ton trucks with sideboards to build them up to approximately 5 tons. In the pit, the trucks operate either on the coal or the bottom, depending upon how the stripping is going. The practice is to load each cut completely out and so, at times, operation on the bottom is necessary. When operating on the bottom, a reasonably good running surface is provided by working it over with the bulldozer.

Good haulage was set up as an essential item in assuring production of the desired tonnage, and consequently considerable care was given to both the layout and the type of road constructed. Length of the haul from the pit to the preparation plant is approximately 4,000 ft., the road entering the pit at one end. In construction, a good sub-grade was first established and then the running surface was made by putting on 18 in. or so of "red dog." One stream was crossed by a 48-ft. span plate-girder bridge with 14-ft. wide deck on concrete piers.

To facilitate dumping and gravity flow of the coal, the tipple was located at the foot of a gentle slope, up which the trucks run on a loaded road to the Fairbanks scales. When weighed, the trucks back off the scales, and up the ramp to the 175-ton mine-run bin. On the return trip, the empty trucks take a separate route to the main road to the pit. Grade on the loaded road was held to approximately 7 percent, while the empty road is somewhat steeper.

Truck shipments go out over a similar road ¾ mile long to the State highway in the opposite direction. The majority of the shipments, however, are made by rail. A Caterpillar 112 road patrol is employed in keeping roads in good shape.

A double ramp enables two trucks to dump at one time into the 175-ton timber bin at the tipple. From the bin, a feeder moves the coal out onto a short Fairmont belt conveyor, where it is picked. This conveyor discharges to a Morrow shaker screen. Sizes normally made are a 5-in. or 1¼-in. lump, a 5x1¼-in. egg (when running 5-in. lump) and 1¼-in. screenings. Lump and egg are boom loaded. At the end of the screen is a 36x36 Jeffrey single-roll adjustable crusher, which can be used to break down lump, egg or both to make screenings when desired. Provision also is made for loading mine-run directly and for shipping certain combinations, such as a 5-in. resultant. The Harris Coal Corp., Cleveland, Ohio, is exclusive sales agent for the Bridgeport mine.

# D. C. FRAME GROUND:

## Advantageous or Disadvantageous?

**Is a Solid Ground From Machine Frame to Rail Without Disadvantages?—Some Question Its Advisability From the Standpoint of Safety—Their Case Is Presented in the Material Which Follows**

*By* ***GEORGE C. BARNES JR., E.E.***

**Senior Engineer**
**West Virginia Engineering Co.**
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WITH mine inspection under both federal and state auspices, and with much emphasis being placed on electrical safety, particularly as to solidly grounding the frames of electrical machines, such practice should be scrutinized. There is some question as to whether or not solid grounding is the safest practice in coal mining. It also is questionable whether or not it is in the national interest in time of war.

Use of 3-conductor cable on d.c. electrical equipment employed at working faces is highly and widely recommended. One conductor is positive, one is negative and the other is for connecting the frames of equipment solidly to the mine rail in establishing a ground.

From the standpoint of safety, this establishes machine frames at ground potential and, in the event of electrical leakage within equipment, protects the operator from shock from the frame to earth in all but some highly improbable situations. However, if shock is experienced *without* this grounding, it is not maximum shock.

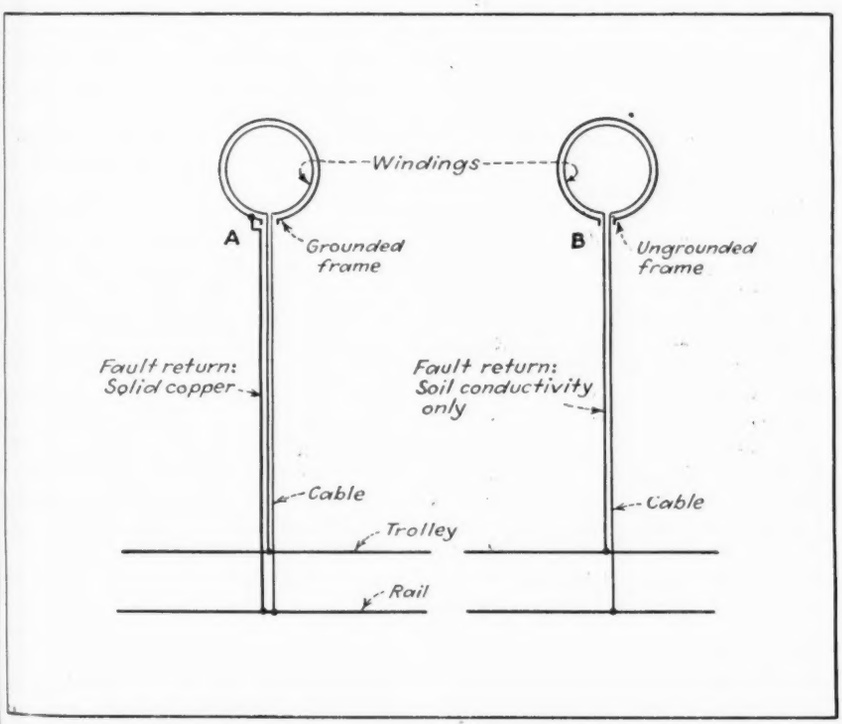
Any shock received from an ungrounded machine at the face usually is frame to bottom. Any contact with the bottom (or rib or top) usually is high resistance in path back to the mine rail and thence to the generating equipment. Too, the machine from which shock is received usually rests on the bottom, this tending to equalize potential and minimize shock. In short, the possibility of a serious shock from ungrounded machine frames is not believed to be great with the 250-volt equipment usually employed in coal mining.

If the ground connection to rail is used, shock from machine frame is of course obviated. The possibility of shock from a line conductor must not, however, be overlooked. While no man should attempt to work on equipment when the cable is connected, human nature being what it is there is the possibility that operators will enter control boxes to correct or attempt to correct minor faults while a machine is "hot." Insulation of conductors does not last forever. Fuses must be replaced and some portions of control boxes are "hot" even in off position.

In short, there are possibilities of shock other than from machinery that has become faulty. In the event of such shock, with the machine frame tied solidly to the rail, the shock received will be the most severe possible—directly across the line. Such shock is highly dangerous while shock received from the ungrounded frame of a faulty 250-volt machine is not. It is felt that in directly connecting machine frames to mine rails hazard may thus be increased rather than decreased.

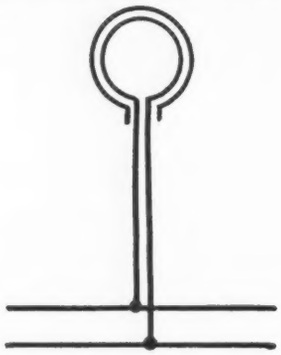
Use of electricity in coal mines introduces hazards other than those of electrical shock which also should be considered. A fault developing in a machine, the frame of which is *not* solidly grounded to the rail, does not result in severe fault current because of lack of a solid circuit. If the machine frame is tied to the rail, however, fault currents are very severe. Fuses, of course, are blown. Even so, the excessive currents must flow *before* fuses blow. Very high temperatures and a considerable arc flash result. This may even burn through the frames of permissible equipment. Such things, in dusty or gaseous places, may easily result in explosion, fire or both. Also, operators may be seriously burned by the dynamic arc.

Aside from the question of safety,




**Mining electrical machinery with frames grounded and ungrounded.**

**FRAME UNGROUNDED**



## ADVANTAGES

1. Fault currents to ground limited, reducing fire.

2. Reduced fault currents decrease danger of serious equipment damage.

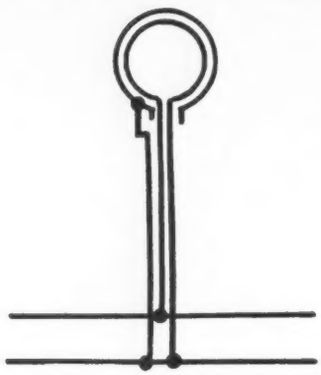
3. Any shock, line to machine frame, is attenuated.

4. Saves copper.

## DISADVANTAGES

1. Attenuated shock can be received from frame if winding becomes grounded to frame.

**FRAME GROUNDED**



## ADVANTAGES

1. Shock from frame to earth highly improbable.

## DISADVANTAGES

1. Shock, line to frame, at maximum severity.

2. Winding faults can result in much fire.

3. Faults in windings may destroy machine.

4. More copper used.

copper is utilized in making such ground connections. Where long cables are necessary this often amounts to a considerable weight of this vital metal. Use of strategic material to effect a questionable safety measure does not appear to be in the national interest.

With frames of machines grounded solidly to the rail the slightest fault developing in the machine winding can mean heavy damage. Field coils can be destroyed, armatures burned up and even armature cores or field frames burned beyond redemption. In this time of war, neither the skilled manpower nor the materials are readily available to replace or repair such machines. Coal is badly needed and our machinery must be kept in operation.

All these arguments are based on the fundamentals of the electrical circuit. The principle is one of circuit resistance. The accompanying sketch clarifies the effects discussed. In Case A, the machine frame is grounded to the rail. In Case B it is not. Should the windings of either Machine A or B become grounded, or electrically connected to the machine frames, the reason for the inspecting agencies favoring the frame ground is demonstrated. With the frame grounded as in Case A, the frame will not cause electrical shock on contact of a man between frame and earth.

### Shock Possibilities

With the frame ungrounded, as in Case B, electrical shock can be experienced by a man making contact between earth and frame. However, experience in obtaining driven grounds in earth at coal mines testifies to the high resistance usually encountered. The return is not solid and usually will be of such high resistance as to render such shock relatively harmless. In fact, in many mines, no shock can be felt at all under such conditions. Occasionally, of course, wet places result in low ground resistance. However, the machine itself, resting on the bottom, has established a frame ground as any ground contact that can be expected through the body of an operator or attendant. Shock is then greatly attenuated, amounting to that imposed by the difference in contact voltages, if any.

While grounding of machine frames is no doubt advantageous in preventing uncomfortable shock at times it is hardly of great importance in lowering serious-accident rates, as mine potentials are almost universally low at 250 volts d.c.

With the solidly connected ground as already discussed, the hazard of fire or arc flash is greatly increased in the event of winding failure. Also, damage to machinery which will render it useless, difficult to repair or beyond repair is made much more probable.

With the frame ground solidly connected any shock suffered by an operator from line conductor or controller part to machine frame is at maximum severity, whereas, with the frame ungrounded, the shock is attenuated because of the high-resistance return unless of course, a wet place with low contact resistance is encountered. shock could not be more severe, in any event, than with the grounded frame.

The accompanying comparison sums up the points discussed. It is felt that the advisability of using the frame ground is definitely questionable.

JOB TRAINING IN ACTION. How to assemble an air drill. Right training promotes efficiency.

# JOB TRAINING

## Raises Efficiency in Coal Production

Efficiency and Safety Better With Trained Than Untrained Men—Value of Training Already Proven But War Has Heightened Its Importance—What Job Training Is and What It Can in Coal Mining

*By JAMES R. SUTPHEN*
Assistant Editor, Coal Age

TOP MANAGEMENT of a coal-mining company was discussing recently whether job instructor training was needed, whether the foremen knew how to break in new men. Someone suggested they find out. They went down to the foreman's office. He, a tough realist, had just introduced a new man to his duties.

"Okay," he said, "get to work, and I just hope you're not as dumb as the last so-and-so they sent me."

The company adopted a job-training program the next day.

Not all foremen are that abrupt, nor do they all carry the "exposure" method of job instruction training to such extremes. On the other hand, all management is not as quick to sense that hit-or-miss training means loss of time, money and production.

The fruits of a training program are even more important now that war-time conditions have brought coal mining face to face with a shortage of man-power, a tight equipment situation and heavier and heavier pressure for production and still more production.

Both the worker and the supervisor must be considered in job training. Principal objective for the workers, both old and new, is to teach them to understand their jobs and to be safe and efficient. Instruction must start from the beginning with new men, since they have fewer or no bad habits to be eradicated and are in a more receptive mood. With old employees, new methods must be explained and applied while at the same time there must be assurance, even though the worker may have been on the job for years, that he understands his task and is doing it in the safest and most efficient fashion.

Normally the foreman's hardest task is how to teach the men under his supervision. The foreman knows his job, knows it thoroughly, but can

he give competent, friendly, and understandable instruction to someone else? When that difficulty has been overcome, it not only makes job training more effective, but also makes possible the important by-product of good relations between employee and management.

No job instructor training program will succeed where management does not appreciate its importance and give it a fair trial. Management must be convinced that thorough instruction will promote safety, increase efficiency, and reduce costs—which it does.

Before going into what job instruction training is, it is more important to discover what it isn't. It is not a speed-up program nor does it contemplate the use of additional men or equipment to accomplish its purpose. The War Manpower Commission's Training-within-Industry Division, now doing the bulk of the work in coal mining, says it places production tools in the hands of management. In other words, it aims to make the most of what is available. That axiom is vital today, with manpower and material tight, and will be even more vital tomorrow, when the end of wartime demand will add to the pressure for lower costs and higher efficiency.

### Understanding Promoted

But aside from the concrete advantages to management of maximum efficiency in the employment of men and materials and consequent reduction of production costs, job instructor training fosters the psychological advantage of bringing the supervisory and worker forces into closer touch with the executive, giving them a keener appreciation of management problems, an understanding of the industry's difficulties and hopes, and a sense of their own stake in the industry's future. And it should, if properly undertaken and applied, make everyone's job easier.

Instruction to the worker usually comes best from a supervisor or foreman trained in job instruction. And, generally speaking, it comes best on the job. But special classes may be held, and one company found a special working place for new men, where they were under the supervision of trained instructors, a valuable investment for many years.

With mechanization of coal mining certain to grow more important, training of men in maintenance and operation of new machinery becomes an integral part of any instruction program. It involves new employees and also men who have been on the job for years but who may not be familiar with the operation and maintenance of new appliances. It is needed particularly now because of the necessity of proper care and full use of available machinery. There is no need to belabor the fact that machinery must work at full capacity and that a broken-down machine is an idle machine. One tested method for maintenance training has been courses given by the mining company alone or in cooperation with the machinery manufacturer, extension schools or other educational agencies, using the company's shop and maintenance facilities—in other words, learning while working under actual conditions.

The question of recruiting new men to the coal industry is a phase of training which must concern every operator. The day of the father's taking his son into the mines to learn the trade has all but passed. Every operator knows that young men are reluctant to enter the industry. Some work in vocational guidance has been done to point up the advantages of coal mining, but not enough. Primarily it is a task for the companies, but educational institutions can help One Ohio company has just taken on 14 youths—and is looking for more—at its largest machine shop for the training in the care, handling and maintenance of mine machinery in the post-war future. Federal and State authorities are cooperating.

Job training should not stop with one class or one course. To accomplish its objective it should be a continuing operation. Supervisors and foremen who have not taken the course should be encouraged to attend the classes. It will familiarize them not only with how it is done, but just as important, with what is done. Foremen should be encouraged to pursue home study and extension courses, many of which the company itself can sponsor, with outside or company instructors.

In one form or another, job training has been used in the coal industry and every other industry for years. But war and scarcity brought the need for a quicker, more comprehensive method. It was supplied by the War Manpower Commission's Training-within-Industry Division, now active in most of the coal fields of the country. TWI's services, not only in training job instructors, but in fitting foremen to handle their jobs and get along with employees, is open to all companies.

In TWI's program, institutes of not more than a dozen foremen and supervisors are the first step. Five two-hour sessions are normal. There is nothing mysterious or miraculous about them. They are taught by men who have been trained themselves for that purpose from a textbook no bigger than an ordinary business card. They stress only tested methods of imparting knowledge and instruction. Once the institute is finished, it is up to the company to carry on. Institute graduates in turn instruct other company men in how to train until the desired number are available. As new supervisors or foremen are promoted from the ranks of workmen, they, too, take the program. The success or failure of the program is outlined in TWI's password:

"If the learner hasn't learned, the teacher hasn't taught."

### Four Points in Training

A typical job training course stresses four major steps in training work:

1. Prepare the worker to receive instruction. Basis of this phase is to use the friendly approach. The approach used by the foreman cited at the beginning of this article was scarcely calculated to inspire a receptive frame of mind in the new worker.

2. Present the operation. The keys here are to outline the job, step by step, to give instruction in small doses, and to be patient.

3. Try out his performance. Let the workman do the job, then have him repeat it, on the theory that by doing it himself he will not only learn the job, but, more important, he will understand it.

4. The follow-up. Putting the workman on his own and then seeing periodically, frequently at first, that he is following instructions.

This is in decided contrast to the method so long used and unfortunately so long accepted of telling the worker:

"Okay, bud. There's the job. Watch the other men do it. You'll pick it up soon enough. If you have any questions, ask me."

Too many foremen, however, give help so grudgingly or treat an inquiring worker so impatiently that he often is more ready to continue making mistakes than to ask for guidance. The obvious result is waste of time, waste of materials, and above all discouragement of the worker with his progress and environment.

Frequently when job instruction is mentioned among coal mine bosses or operators, this objection is raised:

"Oh, it's all right, but it won't work for coal. It's fine for a bench job where you teach a workman to put a nut on the end of a bolt, but how can you work it in coal mining?"

There is justification in the argument. A miner is not set down at a one- or two-operation mechanical job.

He has a dozen things to do, primary of which is to learn to take care of himself. Safety is a greater factor in coal mining than in almost any other industry. Then, too, a section foreman in a coal mine can't stand over his men or walk serenely along a row of benches. His force may be scattered through a half dozen different working places. He has to take a comparatively long trip to oversee all of them. Add to that the variables that may be encountered any day in working conditions at the face and there is no question that coal mining presents unusual problems to the job instructor.

To those coal companies which have given the plan a fair trial, these conditions serve only as a challenge. Training will work for coal mining. It is only harder to apply.

## PROOF OF THE PROGRAM

Like most things, the proof of the program is in the performance. What has it accomplished? What can it reasonably be expected to accomplish? *Coal Age* thought the possible effects of training on the manpower situation were important enough to ask a number of operators those questions. This is what was learned:

1. Those companies which have given training a thorough, unprejudiced and patient trial have found that it has benefited them and their men. They admit the results were for the most part intangible, that it is difficult to convert the advantages into productive figures. But they were satisfied that it had been well worth the time and effort, and (the clincher) they were continuing or expanding their work.

2. Some companies which have tried training found it beneficial but were still unconvinced that its benefits could be fully applied to coal mining.

3. At least two companies said they had been "too busy trying to get out the coal" to give it a thorough trial, but as far as it had gone, they found it satisfactory.

4. The operating head of one company, saying he had no fault to find with training, wanted to know: "Where the hell are we going to get the men to train?"

One company which had gone into job instructor training to the maximum extent believes that the program, developed by both the company and the TWI, is a wholly new concept, that hitherto the new man was employee-trained while now he is employer-trained. It may be only coincidence, but this company had an absentee rate of 5½ percent, its production and efficiency, while slightly off, are better than most in the area, despite the loss of nearly 2,000 employees as well as its location in the midst of an active war-industry area.

Its plan is to take a group of supervisors away from the mines for a five-day training program, during which they eat and sleep in an apartment at company expense and on company time. The personnel director said he felt the most significant fact developed during the training period was that when the men first reported they addressed the production manager, who gave the course, as "mister". At the end of the five days everyone was calling everyone else by his first name.

Production results are hard to measure, this company said. For instance, the best trained foreman might be assigned to the worst section, simply because he was the best. Obviously, the production efficiency of his crew would be off. But how much more would it have been off under a less competent foreman?

"Job training," this company said, "can't lessen the time it takes to make a miner, but it can help him to produce more afterwards by showing him the best way to work," thus benefiting both himself and the company.

Another company that reported it had been too busy to continue with the course after some of its men had been trained, nevertheless said it hoped to keep on with the program as soon as the pressure eased off. This company believed it was hard to apply job instructor training because "coal mining faces a new condition every day and the man at the face has to learn to think for himself." The company made no estimate of absenteeism, but admitted it was high.

Still another organization that had put all its superintendents and most of its foremen through the course found at least one advantage: it broke down the natural reluctance of foremen to express themselves to top management on job conditions. The program, the personnel director said, helps not by telling but by showing the men how to work. Formerly, he said, in some instances they were not even told. What they learned, they learned by themselves. Even though the foremen might want to give some kind of instruction, many of them simply did not have the time.

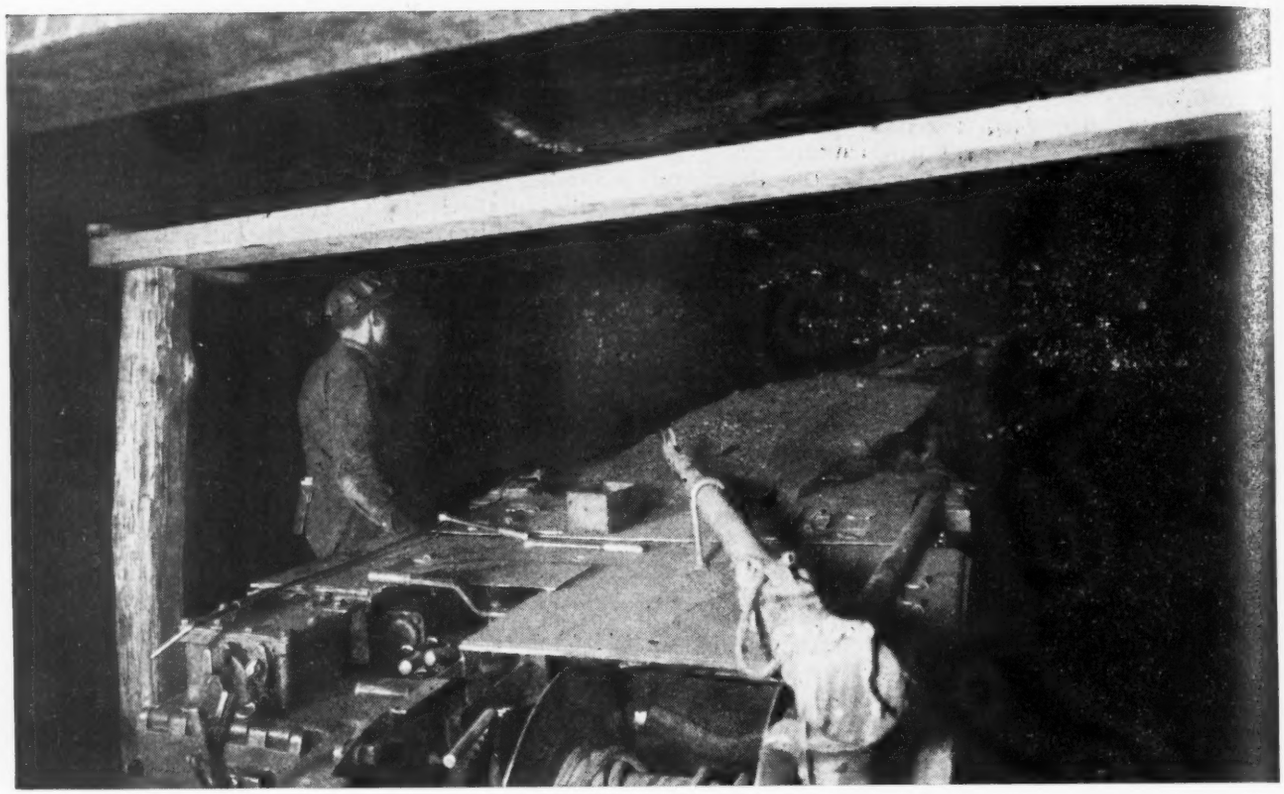
"The program definitely has a place in the coal industry," the personnel director said, "although it is more easily adapted to a mechanical industry." The company thought well enough of the idea to continue it. This operation had an absentee rate of from 8 to 10 percent, its production was off, due largely to abandoning one of its less productive mines, and it was short about 1,500 to 1,600 men.

The superintendent of a highly mechanized mine said the company's 35 foremen had all been through the job instructor training course, and that he thought well enough of it that if it were to do over again, he would not hesitate to recommend it. He, too, declared it was difficult to apply to coal and admitted that wartime conditions had prevented the company from following through as vigorously as it might have. Most of his foremen, he said, told him they had benefited from the course, but he admitted he did not know whether all of them meant all they said. The company has a high absentee rate, but so far has not been hard hit by lack of manpower, being about 150 to 200 men short out of a normal 1,200 to 1,500.

There are a few of the more notable case histories of job training in the coal industry.

No honest claim can be made that training solves the manpower or equipment problem. It is not intended to. Rather, it endeavors to foster the employment of the most efficient and safest methods for the use of the equipment, material and manpower that exist. Few wartime problems could be more important. Yet fundamentally, job training is no wartime expedient or experiment. It is old and it should be permanent, for every industry strives, or should, for the most complete and effective use of men and machines at all times.

The war, with its unending demands for production and its ceaseless driving of manpower and equipment, has served to focus renewed attention on the constant problem of the training of men. Companies which have instituted a streamlined training program geared to the job have found it pays off in production, in safety and in better employee relations. They have found, too, that under its influence they are gradually adopting a whole new philosophy of training. It is a switch from the negative to the positive, to showing a worker what to do instead of telling him what not to do.



Cutting under the parting, after which much of the rock usually falls.

# PARTING REMOVAL

## Solved by Using Track-Mounted Slabbers

### Complete Removal of Parting Essential for Maintenance of Quality—Problem Solved by Installation of Slabbing Machines—Savings Include Reduction of Hand-Work Labor From Four Men to One

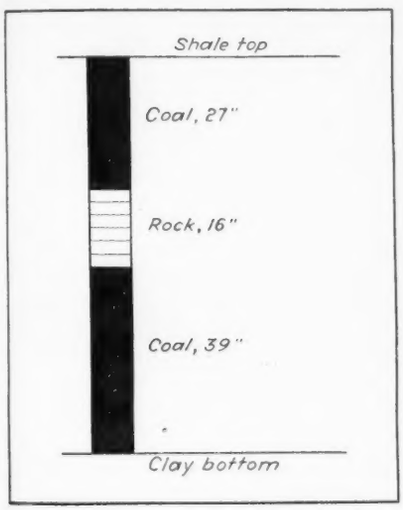
THE DIFFICULT problem of removing partings in a coal seam has been solved by use of track-mounted slabbing machines at the Kona operation of the Elkhorn Coal Co., in Letcher County, Kentucky. The seam being recovered is the Elkhorn No. 3, exceptionally low in ash and as a result in excellent demand at premium prices.

Partings, however, constitute a difficult problem from the standpoint of removal completely and economically. These dirt bands are not uniform in either location, thickness or structure. Sometimes there is only one parting, and sometimes there are two or more, of varying thickness to a maximum of 30 in. The thin partings are usually soft shale, but the thicker partings are much harder, increasing toward the center to a very hard rock. The complete elimination of these dirt bands is essential in maintaining the low ash content of this coal.

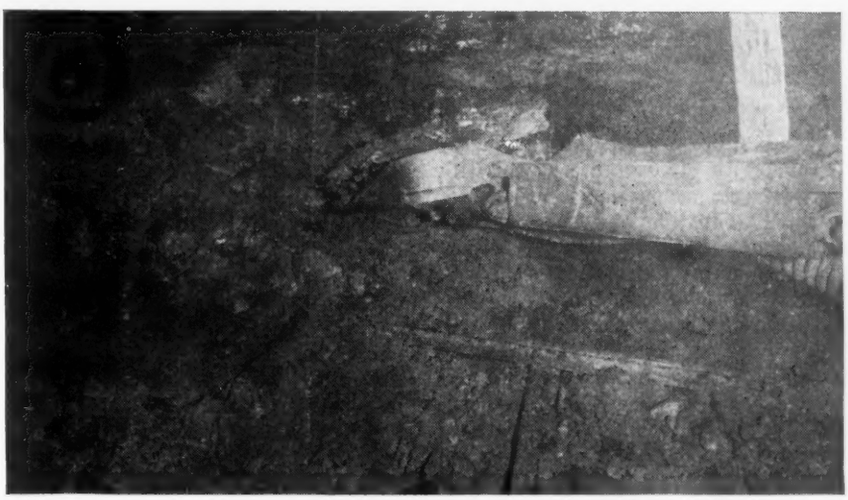
Several machines were tried with varying degrees of success, but a satisfactory solution was not obtained until the purchase of Goodman 1224 track-mounted slabbing machines. The thin partings are readily cut out but the removal of the thick partings is much more difficult. The machine first cuts across the bottom of the parting, taking a small amount of coal to insure the removal of all of the dirt. As the cutting proceeds much of the rock falls behind the cutter-bar.

After the completion of this first cut the cutter chain is reversed and the cutter-bar is tilted slightly. The cutter-bar then returns through the cut, raking out the rock. In the thicker partings it is necessary to make several passes before the large pieces are all removed. Sometimes the parting does not fall freely and the machine is used to pull it down. In the early use of this machine, single slabs of rock weighing as much as 2,000 lb. were pulled out successfully. The removal of such large rocks, while indi-

Raking out the rock on the return swing of the cutter bar. One or more passes are made as necessary.




Section of coal seam showing thick parting removed by slabbing machine.



Loading parting material with track-mounted machine after it has been raked out by the slabber with final cleaning by hand.

cating the ability of the machine to handle anything encountered, was, however, found to be impractical.

It is now the practice to drill and shoot the large slabs after which they are readily removed with the cutter-bar. After the machine has removed all of the large pieces of rock, men pull out the small quantity of fine rock remaining by hand with long-handled bugdust shovels. The quantity remaining to be removed by hand is so small that only one man is needed to clean the kerf, whereas prior to the introduction of the slabbing machine four men were required.

After removal, a Goodman track loader loads the rock, following which both bottom and top benches are drilled and shot. The track loader then returns and loads the coal.

### Flexibility the Answer

The flexibility of the new 1224 Goodman slabber is such that the cutting element can be manipulated very much like the human arm, except that the human arm cannot be revolved at the elbow, whereas the entire cutting element of the slabber can be revolved a full 360 deg. It is this flexibility that enables the operator to manipulate the cutter arm in the kerf and rake the rock out, very much as a man would bend his arm at the elbow and twist his forearm to perform a similar job with his hand. Hydraulic controls ease and speed up the almost unlimited combination of motions available to the operator.

When moving, the cutter-bar can be folded back like a jack-knife, but good balance and the ease with which the cutter element can be swung as a result of the hydraulic control make jack-knifing necessary only on rare occasions. Loading and unloading are, of course, unnecessary, as compared with shortwall equipment. When the machine finishes a cut, it is ready to move.

# SUNSHINE MINE

**General view of the tipple, office and truck yard at Sunshine mine. The main screen slopes down from the headframe and the bins are arranged on either side. Behind the tipple is the boiler plant and engine room.**

EVER SINCE the early days in the wagon mines era the problems connected with the operation of the little mines have been many and troublesome. Production has caused many a headache. Maintenance and expansion, overhead and coal sales all have been nightmares in the life of the small coal mine operator in the past. But these are only the mildest of bogies in comparison with the real troubles that crash down on the heads of the operators of the little mines of today. There is the cost of modern installations to be met for the sake of better production methods. Better preparation of coal is necessary to meet the stiff and ever growing competition. Government requirements and restrictions make necessary a tremendous volume of office work. Mining equipment and supplies are growing more and more difficult to obtain. In short, only by the most efficient operation is it possible for the small mine to exist at all.

## The Job Ahead

So it was when the present owners purchased the Sunshine mine, Bicknell, Ind., in October, 1941. Due to labor trouble, the mine had been operating for more than a year with only one-fourth of the 80 employees working. Supplies had been almost exhausted. Equipment had depreciated perceptibly through lack of proper repair and upkeep. Production had slumped to a pitiably low daily tonnage. Trade had dwindled to only a few straggling trucks each day and the entire business was slowly rotting at the core.

Now, two years later, Sunshine mine is flourishing. Well equipped and supplied, it has some 140 employees, hoists between 700 and 800 tons a day. It has a large interstate truck trade, coming from a territory within a radius of some 100 miles, that for eight or more months out of the year absorbs the daily output, except in the smaller sizes, surpluses of which are contracted to small industries throughout this part of the country. It has not been idle at any time under the present management. From a state of most unpromising stagnancy in 1941, this mine has been transformed into a prosperous and progressive operation with a bright future.

Owned by a corporation of experienced coal men (John Wolf, John Koenig and his two sons, Russel and Bruce) Sunshine mine is located in the heart of the coal fields of southwestern Indiana, on State Road 67, one-half mile west of Bicknell. Although, in response to war demands, it recently has shipped some surplus coal, particularly in the smaller sizes, during the early summer months when the truck trade was not so demanding, Sunshine is essentially a truck mine, catering to the truck trade of southwestern Indiana and southeastern Illinois. It is claimed to be the largest truck mine in Indiana, and perhaps one of the largest in the Middle West. It mines the Indiana No. 6 vein, 132 ft. below the surface, commonly operated by truck mines in this part of the country. A shaft operation, it employs a steam hoist and two cages. Sunshine mine is operated under the lease system, some 70 or more of its employees being lessees. Its location is ideal for a truck operation with excellent concrete road outlets both northwest and southwest, and good roads radiating to all other districts.

## Seam 4 Ft.; Top Good

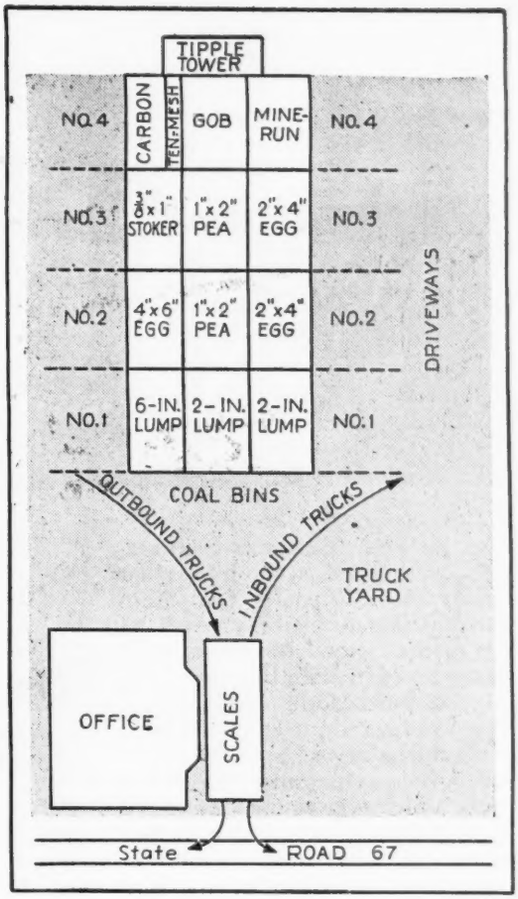
Seam thickness at Sunshine averages 48 in. As usual in this section, the coal contains some slate and sulphur. About 10 in. from the bottom is a narrow band of plate sulphur, with a narrow streak of slate at or near 14 in. from the top. There is a good slate top throughout the mine which, being generally dry, presents no water problem. The corporation now owns and has leased a block of coal sufficient to keep the mine operating for a number of years.

The method of mining at Sunshine is not materially different from that of most truck mines in this coal field, the room-and-pillar system being used.

# ebuilt Truck Operation Makes Good

## Modern Equipment, Better Coal Preparation and Efficient Operation Put Sunshine Truck Mine on the Profit Side—Bin and Yard Layout Facilitates Loading — Surplus Fines Shipped to Industry

*By* ***WALTER CHANSLER***
**Bicknell, Ind.**

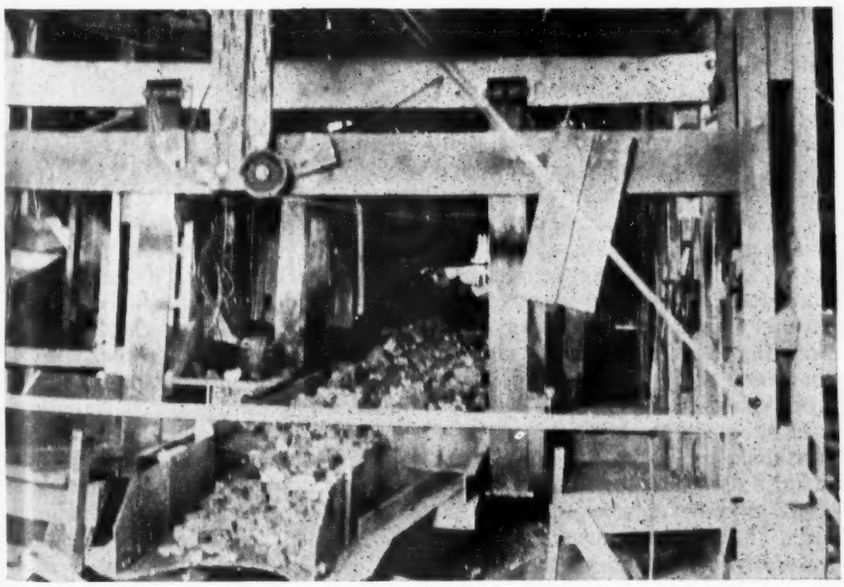



**Truck yard and driveways at Sunshine Mine are designed to speed loading and weighing.**

Hand loading is practiced and the 85 loaders prepare their coal themselves, drill, tamp their shots and set their own timbers. Shooting is done by shotfirers, using Austin pellet powder. There are three rooms for every two miners, which method enables the loaders always to have coal shot down ahead. Drilling is done with hand augers.

For more height, the coal is cut under the rash in all haulageways. In rooms, cutting is done in the rash, a thin band of soft slate and impurities between the coal and the bottom rock. Seven Goodman cutting machines are in constant use, with two in reserve for emergencies. They are powered by a.c. commercial current stepped down by transformers on top. These transformers are moved up every 1,500 ft. to keep pace with the underground development.

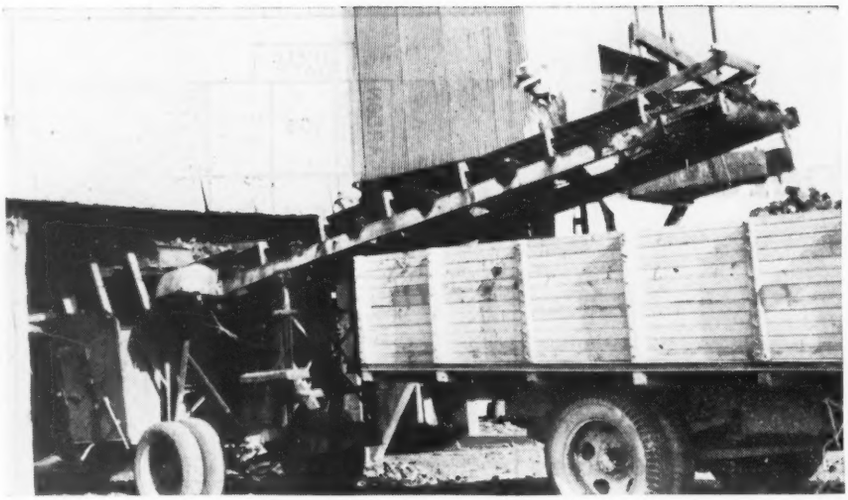
Single ponies and mules are used in gathering the coal at the working faces, while a few spike teams pull the coal at points of heavy production. Wood cars with an average capacity of 2,500 lb. are installed. They are equipped with the Sanford-Day roller bearings. The corporation has some 215 of these cars, most of them in constant use.



**Main shaker screens at point where coal is discharged to the lump conveyor.**

As the coal is gathered from the rooms it is made up into motor trips at the various inside relays, where it is picked up by a 6-ton General Electric locomotive and taken to the bottom for weighing and hoisting. A similar locomotive is kept in reserve for emergency use. D.c. power for haulage is supplied by a 275-volt 364-amp. General Electric motor-generator set on the surface. Track gage is 36 in., and rail weight on the main line is 26 lb. The one locomotive takes care of all coal haulage from the inside relays to the bottom. The working faces are some 4,000 ft. from the hoisting shaft. The mine is ventilated through an airshaft with an electrically driven fan. A manway with stair escapeway is provided alongside the airshaft.

Top facilities at Sunshine comprise a spacious building housing the boiler, engine and generator, with a fairly large supply room at the rear; a wood-frame tipple some 42x56 ft., with a little more than 9 ft. of truck clearance



**LEFT**

**Loading a truck with the portable vibrator-conveyor equipment. With this unit any truck can be loaded from any bin.**

**RIGHT**

**Part of the underground transportation facilities lined up in front of the engine room.**

**BELOW**

**Weighing out a loaded truck at Sunshine: tipple in the background.**

under the bins; blacksmith shop; spacious pony barn, with feed room housing 16 to 20 ponies; two steam-heated washhouses with a combined floor space of some 1,200 sq. ft.; truck garage; 28x48-ft. office building; 36-ft. long Fairbanks-Morse scales with a gross weighing capacity of 44 tons; a vibrator-conveyor mounted on a truck for rescreening coal and loading trucks, which may be used under the tipple to load coal from any of the twelve coal bins; Little Giant coal loader with a capacity of a ton a minute for loading surplus coal off the yards; a truck yard about 100x225 ft.; and a small fleet of trucks, used for hauling contract coal to small nearby industries and to the loading ramp and tipple at the railroad 1½ miles away when shipping coal.

Eight men work on top at this mine, excluding the truck drivers or roustabouts. There are three in the office, one engineer, one blacksmith, one bit-sharpener, one man in the tipple, and one man under the tipple who loads trucks. Extra men are used at times in the tipple for picking gob. The office is well equipped. It has the usual filing system, typewriters, office desks, and an automatic calculator, as well as other modern office equipment. One man weighs coal; one keeps the books and records up to date; and one does general office work. A labor-saving automatic weighing device, the "Weight-O-Graph," is being installed to simplify the work of weighing coal.

## Eight Sizes Produced

Tipple equipment at the Sunshine mine is efficient and practical. Shaker screens, vibrators and conveyors are employed. The shaker has a rather long screen next to the dump apron with 2-in. round openings, under which is another heavy wire screen with 1-in. square openings. Following the first mentioned screen is a shorter one with 4-in. round openings. Farther down the shaker, beyond a 5-ft. solid plate, is a shorter screen with 6-in. round openings. Two Simplicity vibrators take care of the smaller sizes of coal. One produces a ⅜x1-in. stoker; the other, a 10-mesh x ⅜-in. size. Belt conveyors, which can be raised and lowered by small hand winches, are used for filling the coal bins, which have a capacity totaling 800 to 900 tons. A chain conveyor delivers coal from a bin under the shaker screen to the vibrator making stoker coal, while the screenings from this vibrator are carried to the 10-mesh vibrator on a belt conveyor.

Eight grades of coal are made at Sunshine: a 10-mesh size, ⅜x1-in. stoker, 1x2-in. pea, 2x4-in. egg, 4x6-in. egg, 2-in. lump, 6-in. lump and mine-run. There is equipment for oiling stoker coal but, due to war restrictions, it is not being used at present. Screenings are temporarily stored on the yards, where they are later picked up by the truck loading machine for delivery to the various local industries using them.

## Layout Speeds Loading

The truck yard lies east and south of the tipple and loading bins. Eight months or more out of the year this yard is pretty well filled with trucks awaiting their turns to be loaded. Arriving from State Highway 67, some 60 or 70 ft. south of the scales, the empty trucks are weighed and routed out through the yard, where they line up to await their turn to load with the particular size or sizes of coal wanted.

There are four loading driveways under the bins, which can be entered by empty trucks from either the east or west side of the tipple. No. 1 is farthest from the shaft. Trucks taking this driveway load 2-in. and 6-in. lump. No. 2 loads 2x4-in. egg, 1x2-in. pea and 4x6-in. egg, while No. 3 loads 2x4-in. egg, 1x2-in. pea and ⅜x1-in. stoker. No. 4 driveway is next to the

This loading machine is used to pick up storage coal—usually the finer sizes.

shaft and loads mine-run, 10-mesh and carbon (minus 10-mesh). The gob bin is also located above this driveway. The pea and 2x4-in. bins are double bins and discharge their coal to either No. 2 or No. 3 driveways. The other bins are single. Sliding doors underneath the bins, operated by long levers, drop the coal into the trucks. There are four doors to each bin, which enables the operator to load long trucks without having to move them up during the process.

When loaded, trucks can move out through the driveway and come to the scales from the west side of the tipple. Or, if two trucks are loading in the same driveway at the same time, one or both can back out and reach the scales by taking the drive at either side of the tipple. This facilitates loading and enables the loaded trucks to get to the scales and weigh out without delay.

### 2,000 Timbers Monthly

The Sunshine mine uses perhaps an average of 2,000 mine timbers a month, which are purchased from local producers. These timbers are ricked according to lengths in the timber yard northeast of the shaft. Perhaps a thousand 3x5- and 2x5-in. ties are used each month. These are purchased locally from sawmills in the vicinity.

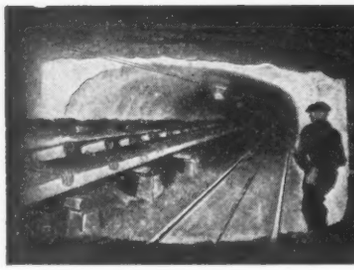
Cost of electricity at this mine is about 3¢ a ton. Labor cost per ton varies at different times of the year, but a fair average would be somewhere near $1.30. Safety measures stack up well with other truck mines in this part of the country. Bosses all have first-aid training, while perhaps 30 to 40 percent of the miners have had instruction also.

West of the Sunshine mine yards are several acres of land which are used for storing coal temporarily during periods when truck sales do not keep pace with production. The coal comprises the smaller sizes, never above 2x4-in. egg, and most frequently it is pea, stoker, 10-mesh and carbon. Later, this coal sometimes is trucked out on contract to various nearby industries and sometimes it is shipped by rail to clear the yards.

The loading tipple and ramp for Sunshine mine is 1½ miles away near the Pennsylvania railroad yards just east of Bicknell. The loading tipple is equipped for screening coal and has a crusher for breaking down the larger sizes. Coal is dumped into a pit, elevated, crushed, screened and loaded in the cars. The loading ramp, located nearby, is of such size that trucks may drive forward going up loaded, then turn and drive forward off the ramp after dumping. A block-and-tackle arrangement is employed for moving empty and loaded railroad cars, using the motor trucks for power.

The loading tipple and loading ramp are used mostly for loading surplus coal in the small sizes for shipment—sizes that sometimes are not in great demand by the truck trade. Also, during the early summer, when coal sometimes moves rather slowly in the truck-trade field, it often is advisable to do some shipping to supply the truck trade with the larger sizes of coal and enable the mine to operate profitably and without loss of time.

Three salient points of management seem outstanding in bringing about much of the success of the Sunshine mine. They are: managing coal sales so that there are no idle days; rail shipments and contract sale of the smaller sizes of coal during the seasons when the truck trade demands the larger sizes only; and anticipating future business by keeping well stocked with repairs and supplies. And, let us add, making a number of coal grades so that the trade may be reasonably certain of getting coal at any and all times, as trucks are taken care of 24 hours a day at this mine as a service to its customers.



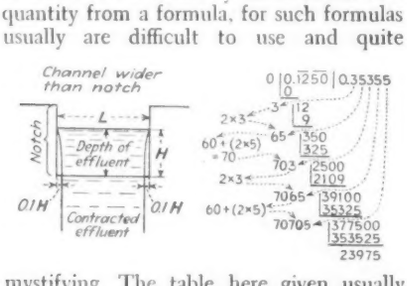
# THE FOREMEN'S FORUM

# To Find How Much Water Must Be Pumped?

***How by Finding Stream Depth, Passing Over Rectangular Notch, Water to Be Pumped May Be Calculated by Ordinary or Logarithmic Methods***

TOO OFTEN pumps are ordered without any knowledge of the quantities of water they will be required to pump. The foreman may specify a pump of the same size as in some other haulageway or located in some room. He is likely to get a pump that is either too large or too small, but if he knows how much water he has had to handle with the pump in some earlier period, his guess as to how much he may have to handle at some future time will be based on fact, not on surmise. Of course, he may have to choose the size of the flood with which he may desire to cope without adding to water standage, and there will be a difference of opinion as to what size of flood that will be.

Then again, he may want to find how much water is being delivered by a pump or how much is going to standage in the sump. Every foreman should be ready to gage the flow of water and to know from what points it is coming. He may have to report to the superintendent how much water is going down to the dip so that the latter can take a pump from storage that will cope with it. He should have a notch already prepared for any such contingency. It will not be necessary to calculate this quantity from a formula, for such formulas usually are difficult to use and quite




mystifying. The table here given usually will suffice. When it fails to give the required information because the width of the notch is different, the calculation can be made in accord with the example given.

Q.—A rectangular notch is cut in the plank forming a weir across a ditch. The channel in which the water flows is wider than the notch, but on the same center line. The water rises to a height of 6 in. in the notch and the width of the notch is 1 ft. What volume of water passes through the notch per minute?

A.—Formulas for weirs in general are correct only when the water comes to the notch at a low speed, and this it will not do if the weir is put across a long, narrow ditch. It is best to put the weir near a large body of water, as, for instance, near a dammed-up room. Then the water will have little or no speed except that which it gets in escaping through the notch. The Francis formula is:

$$Q = 3.33 \times (L - 0.2H)\, H^{3/2}$$

where Q = quantity in cubic feet per second passing through the notch, L = length of the notch and H = height of water above bottom of notch, both in feet.

Then L = 1 ft. and H = 0.5 ft.

$$H^{3/2} = \sqrt{0.5^3} = \sqrt{0.125} = 0.35355$$

as see accompanying figure

$$0.2H = 0.2 \times 0.5 = 0.10 \text{ ft.}$$

Therefore, $L - 0.2H = 1 - 0.10 = 0.90$ ft.

And $Q = 3.33 \times 0.9 \times 0.35355$

$= 1.05959$ cu. ft. *per second*

But 1 cu. ft. = 7.48052 gal. and 1 min. = 60 sec.

So, quantity in *gallons per minute* = $1.05959 \times 7.48052 \times 60 = 475.577$

As the author used only three significant figures in his constant (3.33), he had no faith in any greater accuracy than is expressible in the three significant figures, so the answer will be given as 476 gal. per minute.

**FLOW OF WATER THROUGH RECTANGULAR NOTCH WHERE WATER APPROACHES NOTCH SLOWLY**

**Width of Notch 12 in.**

| Water Height Inches | Gallons per Minute | Water Height Inches | Gallons per Minute |
|---|---|---|---|
| 1 | 35.36 | 13 | 1,320.1 |
| 2 | 98.30 | 14 | 1,443.9 |
| 3 | 177.48 | 15 | 1,566.5 |
| 4 | 268.39 | 16 | 1,687.5 |
| 5 | 368.40 | 17 | 1,806.1 |
| 6 | 475.58 | 18 | 1,922.0 |
| 7 | 588.16 | 19 | 2,034.8 |
| 8 | 705.04 | 20 | 2,143.9 |
| 9 | 825.13 | 21 | 2,249.0 |
| 10 | 947.45 | 22 | 2,349.7 |
| 11 | 1,071.2 | 23 | 2,445.7 |
| 12 | 1,195.7 | 24 | 2,536.4 |

But these values can be calculated with greater ease by using "logarithms," especially when the height of the water above the notch exceeds the width of the notch. The basal principles with regard to logarithms may be simply explained:

1. Every number, no matter how large or small, can be expressed as the power of a certain number, or "base"; say 10. Thus 100 can be expressed as $10^2$ or 10 to the power of 2; thus 2 is the power of the base 10. Again $2 = 10^{0.3010300}$, and 0.3010300 is the power of the base 10 in this instance. Thus both 100 and 2 are powers of base 10, as are all other numbers.

2. The power of any number on any given base is termed its "logarithm" on that base. It consists always of two parts, the "characteristic" and the "mantissa." Logarithmic tables furnish the mantissas, and the person using the table is expected to furnish the characteristic which is the whole number that precedes the mantissa and represents the whole number of the power to which 10 has to be raised, while the mantissa represents the fractional part of the power which always is expressed as a decimal.

We have seen that 2 is the logarithm of 100, so 2 (as characteristic) always precedes the mantissa for all numbers from 100 upward to, but short of, 1,000, and 3 is made to precede the mantissa for all numbers from 1,000 to just short of 10,000, and so on. As you will see, all you have to do is to count the digits to the left of the decimal point (including the zeros) and that number less 1 furnishes the characteristic. For example, if the number is 5430.053, there are four digits (one of which happens to be a zero) to left of the decimal point and the characteristic is 4 — 1 = 3.

For all numbers from one to just short of 10, a zero will be the characteristic and for all numbers from 0.1 to just short of one use $\overline{1}$ which really means —1 but the minus sign is put over the 1 because it refers only to the figure 1 and not to the mantissa which follows, which is not negative but positive. Thus $\overline{1}.8450980$ really is $-1 + 0.8450980$, the mantissa being the mantissa of 7 and the value of the number having $\overline{1}.8450980$ as its logarithm, being 0.7. Similarly 0.2 will be $\overline{1}.3010300$.

From 0.01 to just short of 0.1, use $\overline{2}$ as the characteristic; thus 0.02 will be $\overline{2}.3010300$, and so on. Observe that with numbers less than one, the characteristic is one more than the zeros between the decimal point and the first significant figure. Thus 0.000705 is $\overline{4}.8481891$, for 7 is the first significant figure and there are three zeros between it and the decimal

# *Free Enterprise*

## *THE OPPORTUNITY AND OBLIGATION TO COMPETE*

☆

WE can be prosperous beyond our dreams—all of us—workers, farmers, and business men—but one of the prerequisites is the self-discipline of accepting competition for ourselves as well as others.

* * *

Free enterprise does not imply the freedom to use any or all means to make a profit. It does not mean the right to monopolize. *It means the opportunity and obligation to compete.*

Competition requires *independence of action, free access to the market,* and *no large degree of control over the price* by any buyer or seller. In general, the larger the number of sellers and the more easily buyers can shift from one seller to another, the higher will be the degree of competition (and vice versa for buyers).

But let us not get too academic or go off the deep end. We cannot have perfect competition. We cannot subdivide businesses and labor unions into tiny units to make a multitude of buyers and sellers in each market; we cannot reduce our rich variety of products to a few rigidly standardized items; we cannot educate people to judge quality precisely; we cannot eliminate the costs of bridging space between buyers and sellers. On the other hand, have we gone as far as is practical and desirable in these directions?

We cannot even have a system of highly "sensitive" prices, that is, prices which fluctuate immediately in response to every minor change in demand and supply. This would occur in the dream world of competition-to-the-nth-degree. It cannot occur in the real world, or even in the ideal world of competition best suited to physical facts and human qualities. The economies of large-scale enterprise, the need for adapting products to human wants, the costs of transportation and the costs of issuing and acquiring market information put severe limits on price sensitivity.

Economists tell us that if prices were extremely sensitive, business booms and depressions would be much less severe—provided our stock of money remained fairly constant. But with the somewhat limited degree of sensitivity which is practicable in the economy, price and wage changes cannot prevent severe declines in business activity. *We cannot count on competition alone to cure depressions.* We must look mainly to other kinds of measures to prevent mass unemployment of men and machines.

If we cannot have prices which fluctuate with every small change in demand and supply conditions, we can work toward—and achieve, if we really want it—a system in which prices and wages are at least roughly responsive to long-run changes in demand and supply, a system in which most markets are not dominated by individual businesses, groups of businesses, labor unions, or farm organizations, and in which prices and wages are maintained at levels consistent with free access to markets and to jobs.

In any kind of an economic system there must be some means of determining prices, wages, and profits, and of bringing labor and capital into employment in the industry and place where they are most needed. There are two ways to do this: by administrative fiat or by the impersonal processes of the market. The first of these is typical of the totalitarian state; it frequently involves destruction of individual freedom or fumbling mismanagement. During the war all of us have had some experience with patronizing and paternalistic treatment by the state; we have found out what it means to be pushed around by bureaucrats; and we have discovered that the political determination of prices, wages, and profits leads to chaos when self-interest supersedes the fine fever of patriotism—as it eventually does. I do not mean to imply that we can do without controls over prices, production, and distribution in time of war; but I do suggest that we can learn something from their operation. Even with a united national purpose these controls work badly when human abilities are inadequate for the superhuman task, when personal or departmental jealousies crop up among officials, and when pressure groups try to prey on the rest of the public. Every day more Americans are beginning to understand why our forefathers feared the caprice and tyranny of power.

The impersonal processes of the market in determining prices and wages and in allocating productive resources will, in normal times, save us from the fumbling of bureaucrats and from the Babel of confusion, un-

certainty, and annoyance produced by their regulations. But these market processes will not save us from paying toll to those who monopolize and restrict entry to markets or jobs.

If we want an economy in which we are free to try out new ideas, develop new products, and introduce more efficient methods of production, if we want an economy in which there are great opportunities for men of imagination, inventiveness and energy, if we want an economy wide open to progress, then we must have a free field and fair competition for all comers—without collusion as to prices, markets, or production. This is the only basis on which we have a right to demand freedom from governmental regulation for ourselves and on which we can combat monopolistic tendencies in other quarters.

Let us stand squarely for the principles of the anti-trust laws and against all collusion and combination in restraint of trade. Let us insist that the government review with a critical eye every combination and consolidation which might restrict competition. Let us face frankly the problems of economic power arising out of price leadership and encourage every honest effort to find means to deal with them. Let us not shrink from questions as to whether some great aggregations of plants are too large for efficiency, free entry into the industry, and a free price. While we resist the efforts of the Department of Justice to extend the anti-trust laws by far-fetched and distorted interpretation, and while we fight every attempt to use them as a tool of persecution, let us cooperate in sincere efforts to modernize these laws and extend them by specific legislation to monopolistic practices they cannot now reach. I do not have a simple formula for this, but I believe we must try to find one.

We can then, better face the problem of the growing monopoly in labor which is threatening to make the free enterprise system unworkable. Today labor is going through a stage of empire building reminiscent in some ways of a similar stage in business three-quarters of a century ago. Witness the same buccaneering spirit, the same concentration on selfish interests, and the same disregard for the public welfare. Business leaders learned the hard way that the public will eventually rise up against those who prey upon them. Will our labor leaders be wiser? The right to collective bargaining to protect the weak position of the individual employee is one thing—but the grant of unlimited monopoly privilege to combine into a private government which can dictate its own terms to businesses, industries, communities, and even to the government itself, and which can start a wage-price spiral such as to hinder the war effort and make full prosperity impossible in time of peace is something quite different. We need to find a middle way which will prevent employers from exploiting employees but which does not sow the dragon's teeth. The exercise of arbitrary power by labor threatens not only business, but also all workers outside the unions and all those dependent on pensions and savings for their existence, and ultimately, of course, the well being of union workers themselves.

The idea that the labor problem can be solved if great, powerful organizations of employers will sit down with great, powerful organizations of labor is a delusion. If our experience in the N.R.A. and in the war teaches us anything, it is that the best that can be expected in the long run from such a situation is an armed truce with intermittent civil war. And every truce would be a monopolistic arrangement to take advantage of those not members of the great organized groups. Business and labor unions, whenever confronted with postwar readjustments that are unfavorable to them will be sorely tempted to protect their own special interests at the expense of the public. There will be efforts on the part of businesses, abetted by labor unions, to limit productive capacity, to raise tariffs, to obtain subsidies, and to maintain prices at artificially high levels. The unions will oppose labor saving changes and will seek higher wages even in areas and industries of surplus labor. Already demands are emerging for direct joint action by business, labor, and agriculture to solve the transition problems of special concern to them. While these groups should have every opportunity to register their own self-interest, we cannot entrust our fate to decisions made by pressure groups. If experience is any guide, such coalitions will be almost certain to restrict opportunities for progress and expansion, to exploit the public, and ultimately to injure even the businesses, workers, and farmers included in them. We cannot afford a postwar N.R.A. Resort to temporary government regulation in the transition from war to peace may, however, be necessary in cases of great hardship.

We can be prosperous beyond our dreams—all of us—workers, farmers, and business men—but one of the prerequisites is the self-discipline of accepting competition for ourselves as well as others.

*President, McGraw-Hill Publishing Company, Inc.*

# Exide-

# Ironclad Batteries

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It takes plenty of power to deliver coal, minerals, and ores from America's mines and open-cut operations. That power must come from a dependable source, must flow out constantly when it's needed . . . and where it's needed.

Exide-Ironclad Batteries, one of the most compact and efficient sources of electric current ever devised by man, provide this efficient and dependable source of power in mines all over the country. Exide-Ironclads are noted for long life under the most severe conditions. Their ease of maintenance and complete dependability mean savings in labor and equipment costs.

Every Exide is ruggedly built to take a beating and to come up smiling. When you buy an Exide you *Buy to Last*. Take care of it and *Save to Win*.

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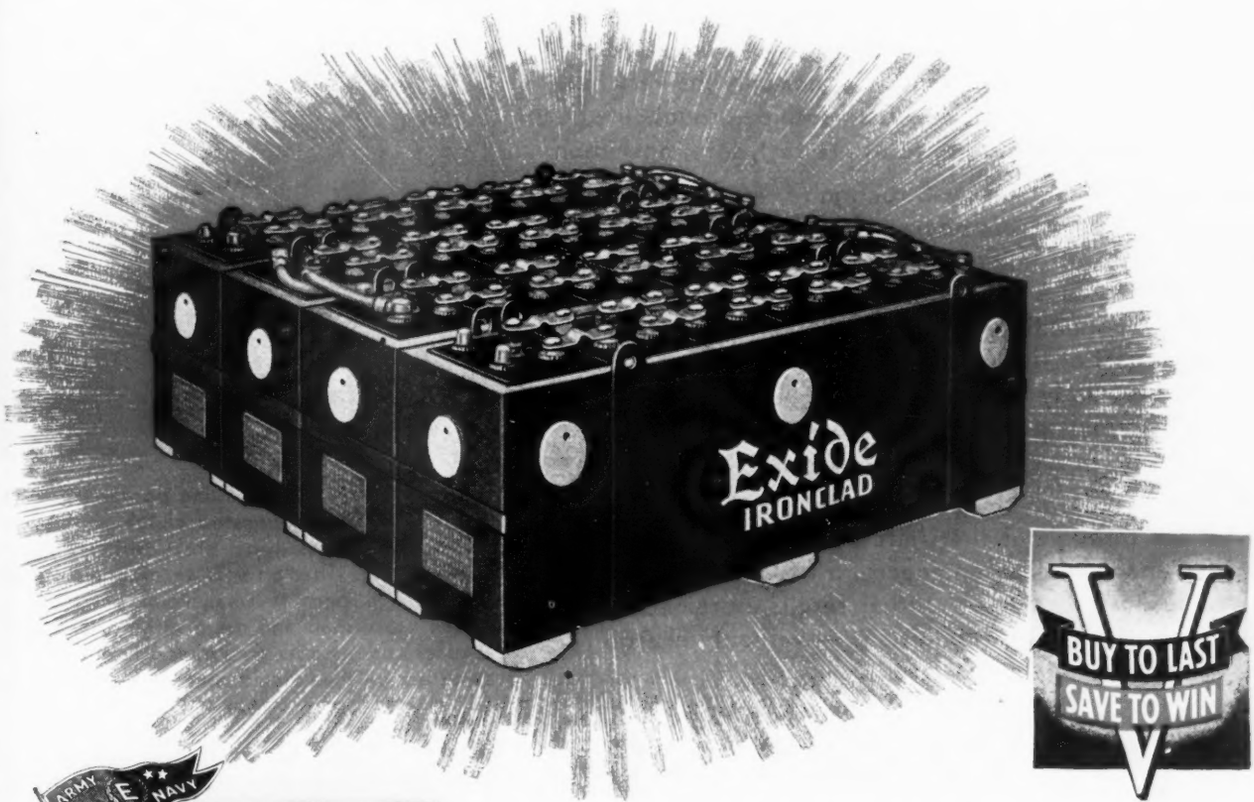


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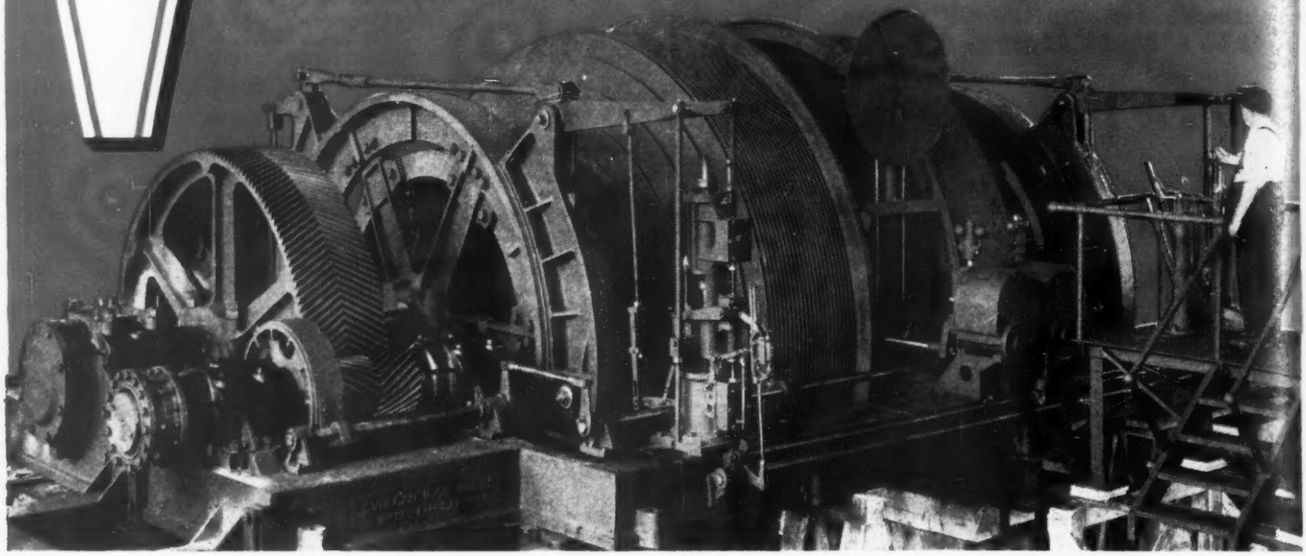
# VULCAN HOISTS

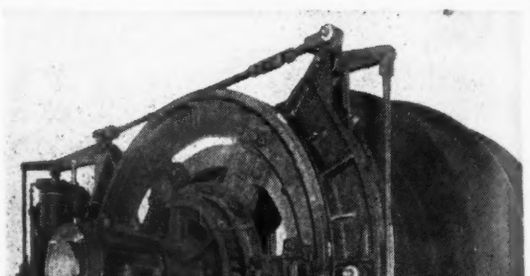
## have "Everything" for Fast, Safe Operation



THE accompanying illustrations show a 1750 hp. Vulcan Shaft Hoist recently assembled in one of our erecting shops before being taken down for shipment. Like all other large Vulcan hoists it embodies not only the very highest standards of quality and workmanship throughout, but also every approved feature to assure fast, safe, operation.

Experienced mining men will recognize, in the illustration above, the powerful air operated brake engines and (immediately in front of the operator) the Vulcan Safety Device which provides dependable protection against overwinding, over-speeding, power-failure, or mistakes of any kind on the part of the operator. In any of these events the hoist stops—quickly but smoothly—and cannot be started again until normal operating conditions have been restored.

Write us regarding any heavy-duty hoisting requirement—no matter how large or difficult. Hundreds of successful installations throughout the United States and many other countries enable Vulcan engineers to make helpful suggestions—usually based upon actual results obtained under comparable operating conditions — without charge or obligation of any kind.



Rear view of same hoist showing positive toothed-type clutch with air-operated clutch engine and parallel motion post-type brake with pressure-graduating rig. The latter is an exclusive Vulcan feature which permits smaller initial clearance between brake-shoe and drum without danger of dragging and assures smoother, more uniform, braking action than would otherwise be possible.

## VULCAN IRON WORKS

Established 1849

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Self-Contained Hoists
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Gasoline Locomotives
geared and electric drive

Load-Carrying Larries
Rotary Kilns, Coolers and Dryers
Crushing Rolls and Pulverizers
Briquetting Machines
Ball, Rod and Tube Mills

point, so as $3 + 1 = 4$; $\overline{4}$ is the characteristic.

3. When 10 is multiplied by 1,000, the result is 10,000, so $10 \times 1{,}000 = 10{,}000$. Now $10^1 = 10$, and $10^3 = 1{,}000$, so $10 \times 1{,}000 = 10{,}000$ could be written $10^1 \times 10^3 = 10^4$ or $10^{1+3} = 10^4$. In every instance, the sum of the powers (or logarithms) gives the power of the product; thus adding the two logarithms of the numbers being multiplied you get the logarithm of the product, and if you look at the logarithms on the right side of the tables you can find the number of the product on the left side of the tables.

The equation $0 = 3.33 \times (L - 0.2H)\ H^{3/2}$ can be supplemented and rearranged to read Quantity in gallons per minute $= 3.33 \times 7.48052 \times 60\ (L - 0.2H)\ H^{3/2}$ where L = width of notch in feet and H = height of water in feet above notch. From tables we learn that

| | |
|---|---|
| Logarithm of 3.33000 | 0.522,444,2 |
| Logarithm of 7.48052 | 0.873,931,8 |
| Logarithm of 60.00000 | 1.778,151,3 |
| | 3.174,527,3 |

The characteristic 0 of the first two figures does not come from the logarithm tables but represents the power of zero because $10^1$ is 10 and 3.33 is less than 10 and therefore zero is placed alongside of the mantissa to show that it fully represents the logarithm of the number; thus 0.552,444,2 is $10^0 + 0.522{,}444{,}2$. In the case of the logarithm of 60, the logarithm of 6 is 0.778,151.3 and of 60 would be $1 + 0.778{,}151.3 = 1.778{,}151.3$ because 1 is the power of 10 that added to the power of the mantissa (0.778,151,3)

| Number | Characteristic you furnish | Mantissa tables furnish | Look in table for |
|---|---|---|---|
| 1 digit | | | |
| 1 | (1-1) = 0 | .000,000,0 | 1 |
| 1 digit | | | |
| 5 | (1-1) = 0 | .698,970,0 | 5 |
| 1 digit | | | |
| 6.54 | (1-1) = 0 | .815,577,7 | 654 |
| 2 digits | | | |
| 10 | (2-1) = 1 | .000,000,0 | 10 |
| 2 digits | | | |
| 54 | (2-1) = 1 | .732,393,8 | 54 |
| 2 digits | | | |
| 78.15 | (2-1) = 1 | .892,929,0 | 7815 |
| 3 digits | | | |
| 100 | (3-1) = 2 | .000,000,0 | 100 |
| 3 digits | | | |
| 179 | (3-1) = 2 | .252,853,0 | 179 |
| 1 zero | | | |
| 0.01 | $\overline{1}$ | .000,000,0 | 1 |
| 1 zero | | | |
| 0.075 | $\overline{1}$ | .875,061,3 | 75 |
| 2 zeros | | | |
| 0.001 | $\overline{2}$ | .000,000,0 | 1 |
| 3 zeros | | | |
| 0.00095 | $\overline{3}$ | .977,723,6 | 95 |

makes the number represented by the power of 1.778,151,3 not 6 but 60. The characteristic 3 added to the mantissa 0.174,527,3 shows that the number is $10^3$ or 1000 times the number of which 0.174,527,3 is the logarithm. Just to be specific, it may be added that it is 1,000 times a number approximating 0.14946, or 149.46, instead of the number obtained from the book.

The figure 3.174,527,3 is the logarithm of the products of the three constants, and it can be used to advantage in calculating a table for a series of different heads of water over bottom of notch, but if you don't expect to calculate more than one problem this intermediate total need not be calculated.

$$H^{3/2} = H^{1.5} = (\tfrac{1}{2})^{1.5}$$

Logarithm of $\frac{1}{2}$ or 0.5 = $\overline{1}.6989700 = -1 + 0.6989700 = -0.3010300$.

We desire to get the 3/2 power, which is the same as the 1.5 power. Consequently we multiply −0.3010300 by 1.5 and get −0.45154500. But this is negative; to make it positive, subtract it from 1 and get 0.548455 and then to bring it back to its real value, add $\overline{1}$ as a characteristic and get $\overline{1}.548455$.

| | |
|---|---|
| Logarithm of three constants as previously obtained | 3.174,527,3 |
| Logarithm of 0.90 from tables | $\overline{1}$.954,242,5 |
| Logarithm of $(\frac{1}{2})^{1.5}$ | $\overline{1}$.548,455,0 |
| Adding + 3 − 1 − 1 + | 1.677,224,8 |
| Or | 2.677,224,8 |
| Number of gallons per minute | 476.5 |

This is so because the characteristic of 2 shows that the number must range between $10^2$ and $10^3$ or between 100 and 1,000.

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## As Dry Rock Is Strong Winter Falls Are Few

In the winter, the air in northern regions on entering the mine becomes warm and is able to absorb more moisture than it could retain while on the chilly surface. Accordingly, it takes moisture from the immediate mine roof. Few phenomena are more generally recognized than the hardening and strengthening of dried clays, and their softness, weakness and plasticity when they again become wet.

Binding material in rocks often softens when rock becomes moist. Some stone can be sawn by hand when wet, yet makes good walls and curbs when dry. Slates cleave well when quarry sap is present and must be kept damp until split.

The farmer finds the hardening of the clay a troublesome characteristic, resisting the blade of his plow or his spade, the pulverizing effect of his disks or his harrow, the penetration of roots and the capillary action of water, whereas the maker of clay roads and the railroad man find it a useful development. The importance of a well-spaded garden, a well-plowed, well-harrowed or well-disked field and a well-drained roadbed are generally comprehended. All these desirables arise from the effect of moisture in softening earthy materials.

*Dryness Gives Strength to Some Rock*—Many rocks similarly are found to have several times as much strength when dry as when wet as well as a greater modulus of elasticity, and in consequence, the roof of the mine often is stronger in the winter than in the summer. Failure of the immediate roof in warm weather is caused not alone by expansions of the rock from moisture but from the loss of strength which also accompanies its wetting. According to competent authority, all the properties of roof-rock change with the advent of a little water. Unfortunately, the hazards of roof falls then are exchanged for those of mine explosions, though elimination of neither can be assured in either winter or summer.

Because rocks shorten when they become dry, the roof may cease to sag after drying. This may reduce the compressions to which it has been subjected when wet, but it also gives it strength to resist tension in case that stress displaces compression. Moreover, it knits and strengthens the bond that knits free strata to the main roof and to other feebler structures, thus giving them and the structures to which they attach themselves greater strength than they would have without such adherence. Anything that makes the several layers of rock act as a unit increases their strength. The weight of the rock also is reduced, thus further accounting for the strength of the rock in the winter months.

As far as the roof is concerned, year-round dryness is the desideratum. It does not seem that it is to be sought, as some allege, because it creates a uniformity of conditions but because dryness is in itself desirable both in winter and summer. Uniform moistness would be a misfortune. But, unfortunately, we have to think of the possibility of explosions, so dampness has its compensations and perhaps also a uniformity of dampness, for an inconstant moistness may cause rock dust to cake and thus to refuse to rise in the face of an explosion.

•

## When Dew Disappears Mines Are in Danger

Mines begin to dry up as soon as the temperature of the air on the surface falls below 60 deg. F. They are beginning now to take on that dryness that makes winter mining proverbially dangerous. The dryness of the air in the fall is evidenced by the rapidity with which the rain dries on fallen leaves and dew ceases to appear on the ground. Dew also disappears on the mine roof. At first, the mine is dried only at the intake, but before long the working faces of the mine will become dry, and the rock dust will tend to cake and refuse to rise in the face of a blast.

Which is more ineffective, damp rock dust or rock dust that has dried and become hard in that process, has never been determined. Both are useless; so the drying of the rock dust probably bodes no good for the mines, and the concurrent drying of the coal dust meantime increases the hazard. These considerations make this a good time to lavish rock dust on the roadways and aircourses, for it is almost certain that at no other time will it cake so little as in the fall and winter seasons. If the deposit is carried over from the summer, it probably will become ineffective in the autumn. The right quantity of rock dust may be present to satisfy requirements, but what about its quality?

# BELTING and HOSE WITH A THUMB

Pick up a pen, a drill, a nail, or paper clip. Watch the thumb move like the jaw of a vice, gripping and guiding. The thumb, unique to man, gives dexterity and control.

More than 2,000 years ago, Aristotle said—"The superiority of man over animals lies in the hand; the superiority over man, in the thumb." Ever since then, the thumb has been a symbol of superiority—a symbol of the extra qualities that make for leadership.

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# STATE-BOARD QUESTIONS

## Pa. Bituminous 2d. Grade Foremen†

### Safety in Pillar Drawing

Q.—What means would you adopt in the drawing of pillars, keeping in view recovery of coal and safety of miner?

A.—Only experienced miners should be employed in removal of pillars. To keep the support as nearly equal as possible all along the pillar line, all the rooms should be driven along parallel lines and of regular and equal width. This can be done only by driving the rooms on sights and using careful supervision to prevent widening of rooms or gouging of pillars. The highest recovery and the safest operation is obtained when the most remote rooms in a heading are drawn first. However, when this is done the rooms should be widened on the outby side of the room (see Fig. 1), because the miner then has the greater protection, and when the miner is protected he is better able to take out all the coal.

With the manner of working shown in Fig. 1, he will be safely outby the pillar-support line instead of being inby, as in Fig. 2. You will see that when the rooms are widened on the outby side in Fig. 1 the miner is protected by actual coal support until he extracts the points or "prominences" of the pillars *A*, *B*, *C* and *D*. Nowhere does he have to go a single foot beyond the line joining these prominences. His car is back several feet from the actual breakline. Widened to the inby, as in Fig. 2, his car has to be quite close to the breakline, and the actual coal-support line or "line of prominences" lies entirely outby the car which he and his buddy are loading. The further they mine, the more risky the work they are doing because, if the roof gives a warning, they must travel farther into danger and have farther to go to get away from that danger and into the clear.

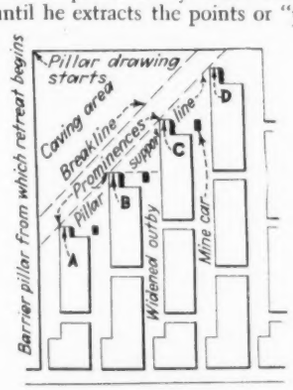



**Fig. 1—Right way. Pillar widened to retreat.**

They depend for safety on timber and the strength of the projecting roof and not on that part of the exposed roof with pillar prominences on either side of it. If the timbers form the breakline, that breakline is outside the actual coal-support line, which is not a reassuring condition. With the rooms widened in the wrong direction (1) the cost for timber, (2) the work of setting timbers, (3) the hazard of operation are all increased and (4) coal and timber may be lost.

When you remove pillars retreating you must reverse the direction in which you widen your rooms or face the consequences. In case of roof breakage, escape to the room roadway is easy when the working face is as in Fig. 1, but hazardous in the extreme when it is as in Fig. 2. The old rule was to widen rooms to the advance, which was the correct rule as long as the pillars are drawn to the advance, but no longer applies when pillars are drawn on the retreat.

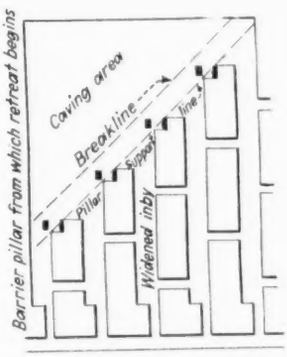



**Fig. 2—Wrong way. Pillar widened to advance.**

### Safety With Small Pillars

Another old rule was to leave wide pillars and drive narrow rooms, and that was an excellent rule for the days when the intention was to leave the pillars standing for a long time, perhaps until the mine otherwise was finished or at least until the room was driven up painstakingly and slowly by hand, and the pillar was being drawn in the same tardy and laborious method. It probably is a good rule still if the cover is heavy. But if the cover is light and the roof none too strong, it is well to have the pillar prominences *A*, *B*, *C*, *D*, *E*, and *F* (see Fig. 3) as frequent as possible to take care of the drawslate, because then the distances such as *BC* will be short and the areas *BGC* and the like then will be as small as can be arranged. Fig. 3 has the pillars half as wide as in Fig. 1. The distance *BC* has been more than halved, as 22 to 47, and the area *BGC* is half as great.

A change like that is worth while if the weight in the whole area being mined is not excessive, if the drawslates are weak and if advance and retreat are rapid. It concentrates operation and brings the massive and still unmined coal which is outby the rooms or even beyond them nearer to the breakline and nearer to the crushing force resulting from pillar drawing. So one must not declare that the safest result always is assured when the pillars are wide and strong. It may be the reverse. Which is best is dependent on your main problem. Is it the main roof or is it the drawslate? If the latter you want frequent even though narrow pillars.

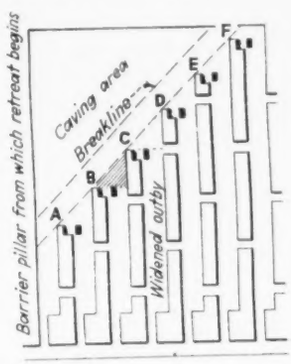



**Fig. 3—Small pillars reduce unsupported area.**

### A Little Safer Method

A good plan is to drive a crosscut, or "holing," from room to room near the

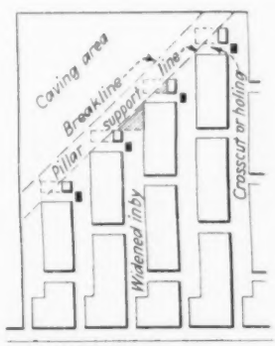



**Fig. 4—Better support with holing and retreat.**

† Continued from November, 1943, *Coal Age*, p. 90.

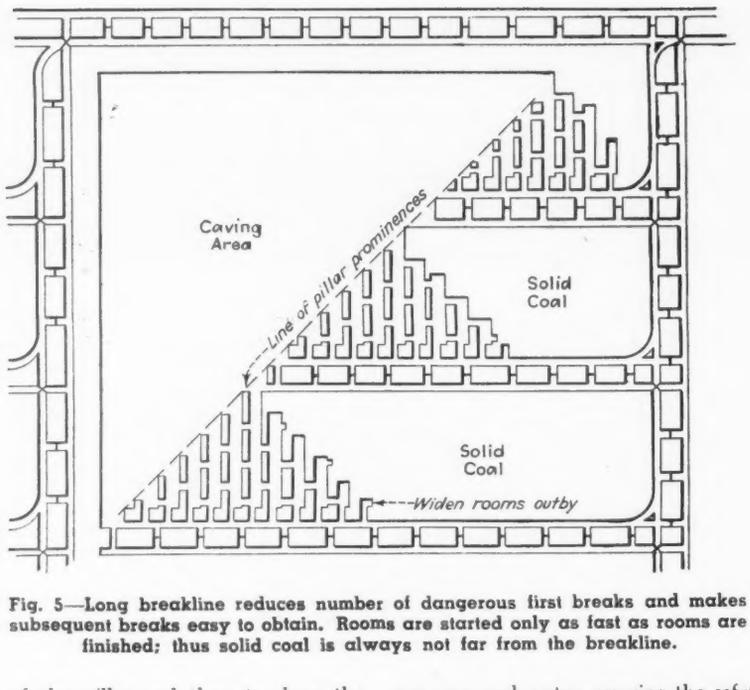



**Fig. 5—Long breakline reduces number of dangerous first breaks and makes subsequent breaks easy to obtain. Rooms are started only as fast as rooms are finished; thus solid coal is always not far from the breakline.**

end of the pillar and then to draw the small pillar thus formed on a retreat from the far end, as in Fig. 4. The mine car is then located at the mouth of the holing. Fig. 4 shows, in solid lines, the most favorable phase of the development. Then, there are twice as many prominences along the line of prominences as there are in the other examples, through when the first cut is made it is beyond the pillar-support line or line of pillar prominences. When the last cut is made, that cut and the mine car are both outby the pillar-support line, which undoubtedly assures greater safety.

### As Few Rooms As Needed

Moreover it is well to have only as many rooms driving up as there are rooms being depillared. Do not let even one room stand after completion. Then there will be solid unbroken coal back of the caving area (see Fig. 5). There will be, in fact, a line of solid coal prominences, one near each entry, assuring the safety of the smaller pillars between rooms. In that figure can be seen how the breakline can be extended from entry to entry. The first break is the most difficult of any to make and often causes much anxiety. Increasing the length of the breakline makes the breakage of the roof more prompt and easy and lightens the burden on the coal pillars.

### Weaker Pillars After Break

It might be justifiable to provide weaker pillars where the breakline will have become long instead of having all the pillars of the same width. Start with strong pillars on the inby entry where the break has to be made and where the strength of the main entry is jeopardized by delayed breakage and then provide narrower pillars where the breakline extends over several entries and the roof breaks without bringing undue pressure on pillars or requiring the setting of additional timber. However, this may spoil the cycle in loading by machine, and it may have to be revised with this advantage in view.

### Angle of Breakline

The angle that the breakline makes to the direction of the entry depends on the number of rooms it is desirable to advance or retreat at a time. With an angle less than 45 deg., the distance GC in Fig. 3 and the area BGC will be reduced, so less timber will be needed, but the area being mined at any one time will be increased, and the solid coal will be further removed from the breakline, which is not desirable. Perhaps 45 deg. is the preferable angle.

### Loading Conditions Determine

It must be remembered that if the number of rooms being driven and depillared is reduced, the breakline will be steepened and the distance between pillar prominences will be increased as also the areas outby the pillar-support line. This is undesirable, but it may be necessary. This angle and the relative width of pillars and rooms is often determined by mechanical loading conditions. However, never forget the importance of revising loading methods if thereby safety, better recovery, larger production and use of less timber can be afforded.

### Avoid Special Posts

A straight pillar-support line will do much to assure breaks at intervals such as will prevent excessive weight on pillars. Having the machines and men where they have protection from the pillar-support line also will be an aid to safety and do away with the need to set special posts which may interfere with the regular advance of the breakline in the outby direction. When timber is drawn, special care, oversight and attention must be given and competent men must do this work using mechanical means for that purpose, which will remove, if desired, more than one post at a time. Remember the safest way usually is the most economical in the long run and often the least costly in the short run also.

# Pa. Bituminous Firebosses

### Parts of a Safety Lamp

Q.—Name the parts of an improved safety lamp and define their use.

A.—*Swivel Hook*—Provision for handling and carrying lamp.

*Hood*—Cover supported by bonnet. This protects gauzes from injury.

*Bonnet*—Structure that surrounds the gauzes, preventing injury. This structure also passes the products of combustion and supports hood.

*Gauzes*—Screens which provide for the escape of the products of combustion and which also lower the temperature of any flame caused by the combustion of the methane that may enter the lamp. The flame thus cooled and extinguished is rendered incapable of igniting methane on the outside of the lamp.

*Glass Chimney*—Cylinder that surrounds the burner, transmits the light of the lamp, separates the flame of any internal explosion from the outside atmosphere and conducts the products of combustion to the base of the space that is protected by gauzes.

*Expansion Ring*—Provides for expansion and contraction of the glass caused by the heating and cooling of the lamp after lighting and after extinction, respectively, or when entering or leaving a methanous atmosphere.

*Admission Ring*—A ring with passages that admit the air with its methane to the interior of the lamp but do it through such restricted channels that no flame can escape and set fire to methane on the exterior of the lamp.

*Baffle Ring*—A ring that prevents the direct flow of air through the admission ring, further cooling any flame that may try to escape through the admission ring.

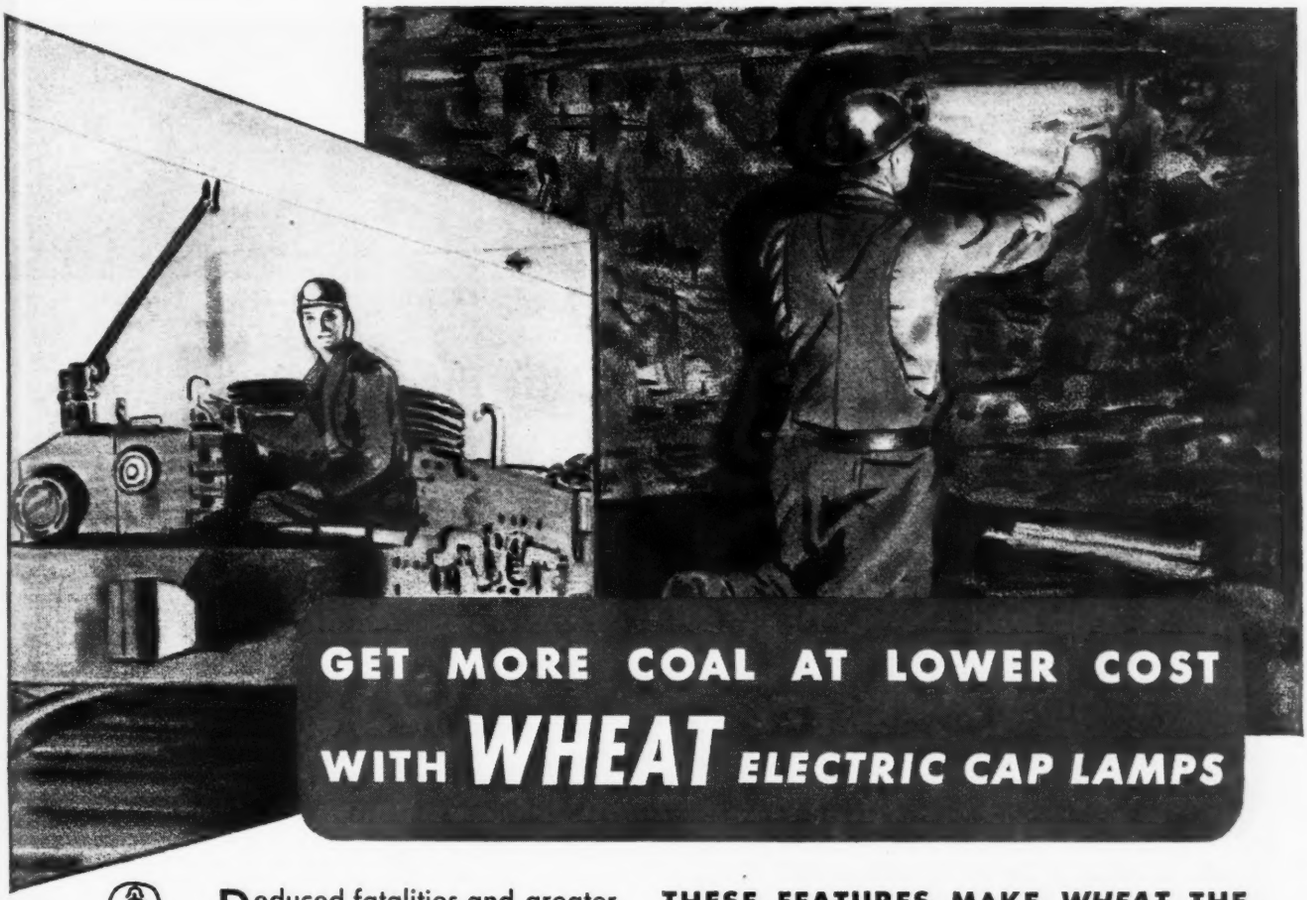
*Locking Ring*—A ring that locks the lamp so that it cannot be opened by the user.

*Font*—A reservoir below the wick tube to contain wick and fuel.

*Wick Tube*—Tube up which the wick passes.

*Wick*—A loosely twisted or plaited absorbent tape, either round or flat, usually of soft spun cotton threads that draw the fuel from the reservoir, or font, to the point of ignition.

*Igniter*—A device which, by the operation of an external mechanism, can be caused to ignite the wick even when the lamp is locked. (3 percent)

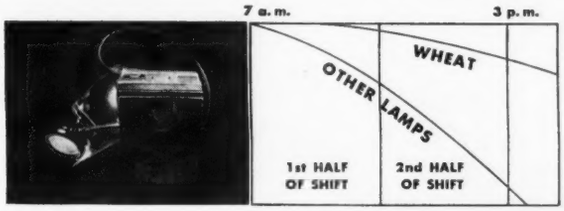


# GET MORE COAL AT LOWER COST WITH *WHEAT* ELECTRIC CAP LAMPS

Reduced fatalities and greater coal productivity can be achieved by the use of efficient, and approved Wheat Electric Cap Lamps — lamps that burn brighter over the whole shift.

Brighter, steadier light will reduce accidents and increase mine output up to 20% per man day—better light—better sight—reduced fatigue.

Wheat Electric Cap Lamps and Batteries cost less, are more economical to operate, and easier to charge. Here are 9 reasons why you can increase coal production with a Wheat.




## THESE FEATURES MAKE *WHEAT* THE OUTSTANDING ELECTRIC CAP LAMP

1. Two bulbs (one for emergencies) — miner is never in the dark.
2. Headpiece weighs less than 6 ounces, Lamp Cord 6 ounces, Battery 62 ounces — Total weight of Lamp complete 74 ounces.
3. Headpiece molded of strong bakelite, sealed, moisture-proof and dust-proof.
4. Rubber battery case — non-conductor of electricity — a valuable safety feature.
5. Battery solution (free) limited to one ounce total both cells.
6. Lead-acid type battery maintains high voltage throughout shift (80 + percent efficiency) — year after year.
7. Battery charged through headpiece and cord of cap lamp — a daily test of all connections.
8. Designed for self-service charging system for lowest lamp-house operating cost.
9. To charge, headpiece is simply slipped on to key in charging rack, and turned to make contact. Nothing to take apart — unit-sealed construction.

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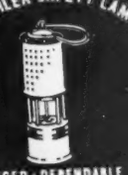


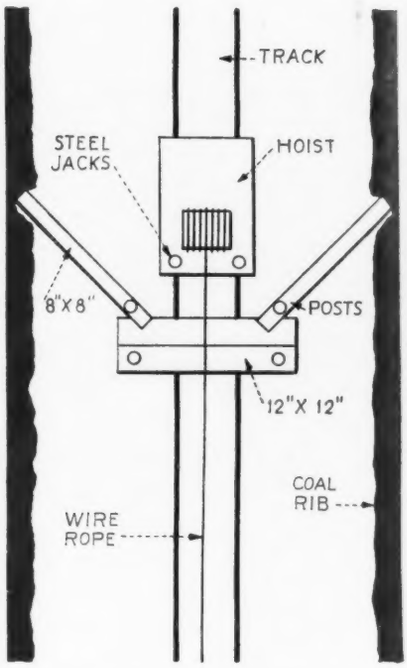
# TIMELY OPERATING IDEAS

## Spotting Hoist Set on Track Has Bumper Protection

Looking out by and in the direction of the transfer-station loading point.

IN A TRANSFER CAR SET-UP of the Powhatan Mining Co., Powhatan Point, Ohio, it proved convenient to install the car-spotting hoist directly on the track rails, thus using them as a foundation and giving the rope a straight pull without sheaves. But experience soon demonstrated—and in this case without damage to the hoist, fortunately—that a bumper would be necessary to protect the hoist from trips pushed too far. The illustrations indicate the method of installation.

The 12x12-in. bumper stop consists of four 6x6's spiked together. Two wood posts set straight and wedged against the roof hold the bumper down against the track and two other posts hold the 8x8-in. stiff legs against blocks that rest on the ties. The steel roof jacks holding the hoist are set at an angle to resist the rope pull. On this job the track grade is 1 percent rise from the loading point to the hoist and the trips are pulled in that direction as the cars are loaded. The hoist is a Brown-Fayro with Westinghouse 10-hp. Type SK motor. On page 63 of this issue appears a description of the large car and transfer station section in the Powhatan mine.

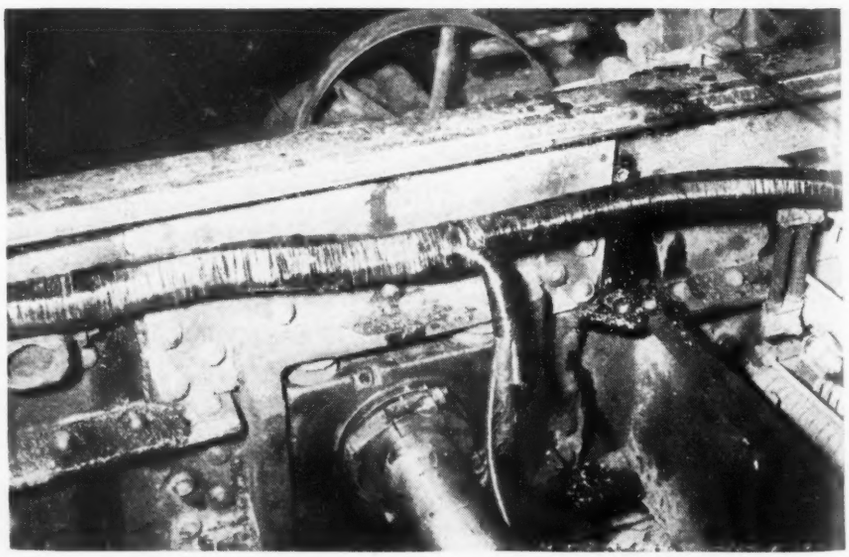



Wooden bumper braced to the coal ribs.

## Plates Added Over Pedestals Repair Channel Frames

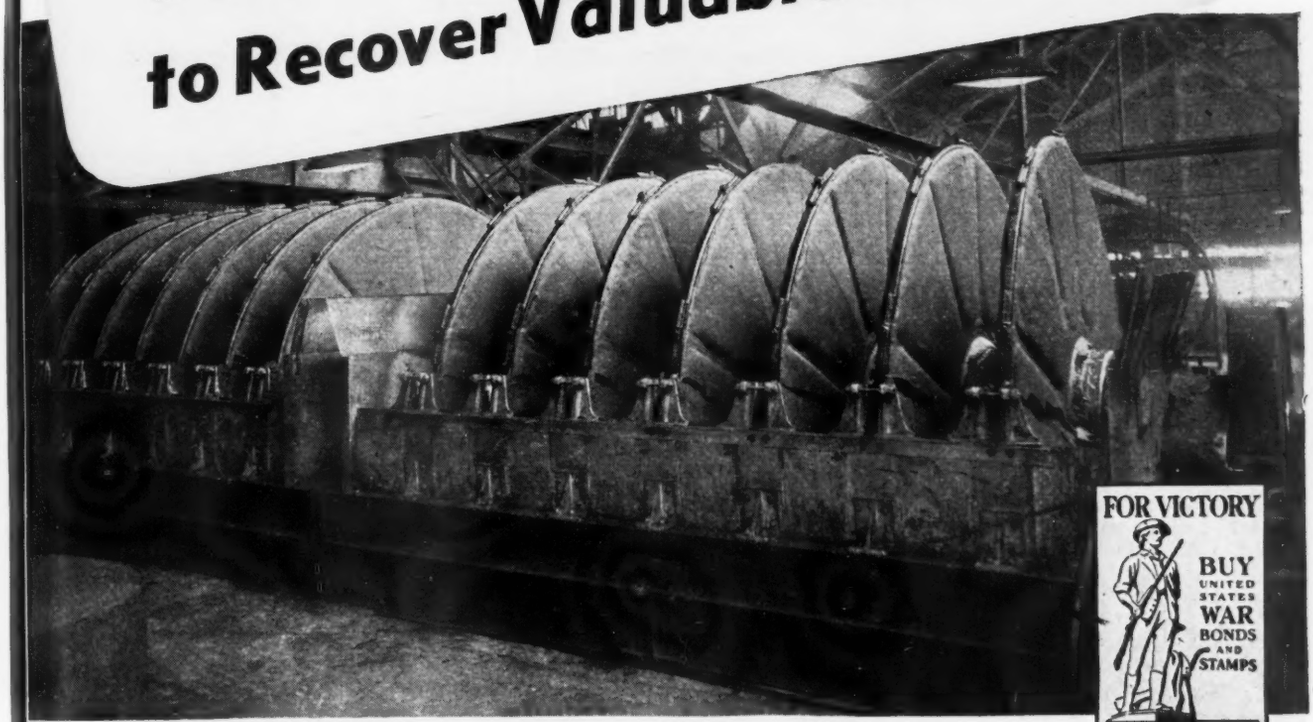
GATHERING LOCOMOTIVE frames of an old type consisting of two channels riveted one above the other have the habit of breaking vertically across the upper channel above the journal-box pedestals. A method of reinforcing this part after repair of a break is shown in the illustration, made recently in the repair shop of the Puritan Coal Corp., Puritan Mines, Mingo County, W. Va., where Oliver Ferrell is chief electrician.

After a crack in the broken channel has been V'd out and arc-welded, a $\frac{5}{8}$-in. plate 10 in. longer than the pedestal is riveted in place, then welded all around the edges. These welds include beads along the top flange of the channel and along the top of the pedestal.



Welding around the edge of the reinforcing plate includes a bead around the top of the journal-box pedestal.

# The AMERICAN Way to Recover Valuable Fine Coal




WASHERIES produce fines. And usually these fines have a high combustion value. They're worth recovering directly.

But how?

By filtering on the American Continuous Disc Type Vacuum Filter, such as illustrated above! It is standard practice in several washeries because the American Filter economically reduces the moisture content of the fines to where it is practical to dry the filter cake or add it to larger sizes for cooking purposes.

Today, when every ton of coal counts, investigate the use of the American Continuous Filter for the economical dewatering of coal fines in your plant. In helping you with this, we would bring to your problems, thirty-six years of broad filtration experience in every process industry with considerable work done in the coal industry.

A phone call or letter to our nearest office will bring a trained engineer.

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Among the coal companies using Oliver United Filters for dewatering fines are: Weirton Steel Co., Woodward Coal and Iron Co., Crucible Steel Co., Republic Steel Corp., Jones & Laughlin Steel Corp. Buckeye Coal Co., Pittsburgh Coal Co., and Hanna Coal Company. More than 5,000 tons of coal fines are dewatered daily on Oliver United Filters.

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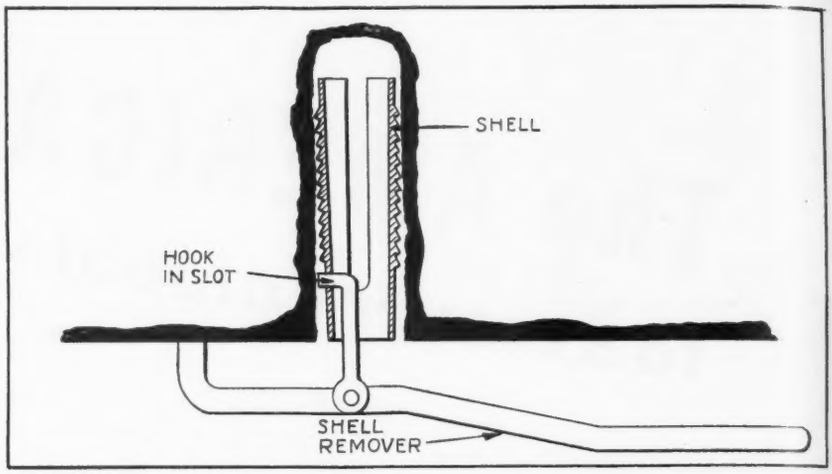
# Hanger Shells Recovered With Special Tool

To facilitate removing trolley-hanger expansion-bolt shells from the holes in the top, James Tyne, wireman, Summerlee, W. Va., offers the device shown diagrammatically in the accompanying illustration. The hook is inserted in a slot in the shell and a stout downward pull usually does the trick. "It works fine," according to Mr. Tyne.

◆




**How shell remover is used.**

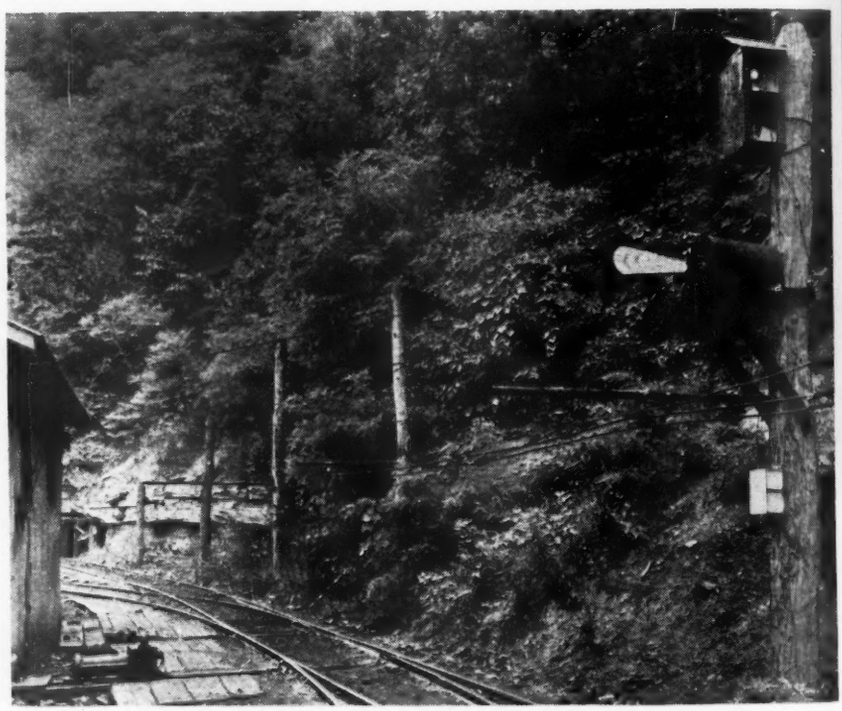
# Motor-Driven Semaphore Added to Signals

Early in mornings and late in afternoons sunglare often gives motorists trouble in distinguishing between red and green traffic lights. That same difficulty was annoying, delaying and dangerous to the main haulage crews at Eunice (W. Va.) mine of the Princess Dorothy Coal Co. It was cured by adding a motor-driven semaphore made in the mine shop.

This semaphore is near the main portal and on the same post with the box containing white and green lights. The block is 4,000 ft. long. The relay operating the signal lamps and semaphore is inside of the mine at a point midway of the block. Manual switches are at each end.

A small d.c. motor, operated from the relay circuit by a contactor control, reverses direction of rotation of the motor to change semaphore position. The arm hangs vertical when the white lamp is lighted for clear track and comes to horizontal for the red, or stop, signal.

An electric switch thrower made by the American Mine Door Co. has been installed on a switch close to the semaphore on the 70-lb. track to obviate stopping or slowing at that point when the signal is clear, thus saving time and making things safer for the brakeman.



**Switch thrower, semaphore and signal viewed toward the portal.**

# Oscillation Refusal Fixed by Rotating Frame

On substation machines the commutators and rings stay in better shape when the armature oscillates—that is, moves endwise—back and forth a fraction of an inch. This brief story relates the solution of a difficulty with a 300-kw. 275-volt Type HCC synchronous converter which, although equipped with an oscillating device, refused to oscillate.

The unit was in service in an outside substation at the Eunice (W. Va.) mine and was operating in that condition when the mining property was taken over by the Princess Dorothy Coal Co. Tinkering with adjustment of the oscillating device failed to correct the difficulty, indicating a magnetic pull toward one end. Bolts holding the field frame to the base were loosened but holes were not slotted enough to allow sufficient adjustment to correct the trouble.

Finally, after an interval of several months, one of the mine officials noticed marks on the base which indicated that the frame was definitely out of center. He suggested the possibility that the frame had been assembled carelessly 180 deg. from proper position on the base. That proved true and when the unit was put back into operation after the change the armature oscillated perfectly.

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The tough steel construction of the famous Edison Alkaline battery has unrivalled ability to meet hard knocks. The strong laminated bakelite construction of the M.S.A. Comfo Cap gives solid protection against head hazards without deterioration from exposure to mine water, grease and perspiration. *This time-proved safety team is doing a vital job today—more necessary and more appreciated than ever before.*

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**EDISON ELECTRIC CAP LAMPS** **M.S.A. COMFO CAPS**

# Changes Plus New Tool Help Button Conveyor

**Instead of one 3,000-ft. length of rope with but one splice button in the line, the rope now is in six sections with that number of splice buttons.**

**Tightening the nut of a button in one-tenth the time that was required with a hand wrench. For this posed snapshot the air hose was not connected to the wrench.**

"MAINTENANCE of our rope-and-button conveyor was reduced materially by the purchase of a wrench." That statement, pertaining to a conveyor which probably is the largest of its type in coal mining of this country, calls for an explanation which will bring out some other important factors that appear in the operation of long, heavily loaded conveyors.

The one in question is at the Eunice (W. Va.) mine of the Princess Dorothy Coal Co. This conveyor, which is one continuous straight unit 1,475 ft. long, lowers the coal down a 32-deg. pitch at the rate of 250 tons per hour. The overhauling load puts a maximum strain of 16 tons on the 1-⅜-in. rope, thus driving the 100-hp. motor, which by regeneration returns as much as 50 hp. to the power line.

The Princess Dorothy Coal Co. took over this mine in 1938 and soon after that began an improvement program in new mobile loaders, power distribution and maintenance to increase production. It now operates two shifts six days per week and produces 3,100 tons per day. With the higher production and continuous duty, difficulties caused by rope wear, button breakage and adjustment constituted a major worry to the new management.

Old records show that when the conveyor was installed in 1928 the new rope stretched between 20 and 25 ft. in the first few months of operation, thus involving a large amount of labor in readjusting buttons to standard spacing. When the new company took it over, the rope then in use was beginning to show broken wires in certain places for unexplained reasons and even yet not understood. How soon these sections of the rope should be renewed was a puzzle. Renewing the entire 3,000 ft. of rope involved the considerations of cost, wasting good sections, delivery date and days of shutdown in making the replacement.

But balanced against these the management naturally was most reluctant to take any chances on a rope breakage which might wreck the conveyor. Accordingly, using splice buttons, work was begun replacing sections of the rope.

The principal difficulty was the time required to loosen and retighten the six bolts of each button when renewing or respacing. It was one mad scramble from Saturday night to Monday morning to effect a readjustment. Correcting a few buttons that are about ⅛ in. out of spacing brings an accumulating error which requires changing every button on that section of the rope.

The bolts are 1-in. special steel with hex nuts. In visiting a manufacturing plant, L. E. Scholl, general superintendent of the company, saw impact-type wrenches in use and right there hit on the solution of one of his rope-and-button maintenance problems. Accordingly a pneumatic wrench, "Power Vane Size 365A," was purchased immediately from the Chicago Pneumatic Tool Co. Weight of this wrench is 30 lb. Compressed air for its operation is available from an air compressor with receiver which operates the rotary car dumper at the headhouse.

With this wrench the labor of adjusting or renewing buttons was cut by 80 percent, thus shortening to a fraction the time formerly required to complete a job. The uniformity secured in tightening of the nuts is another advantage.

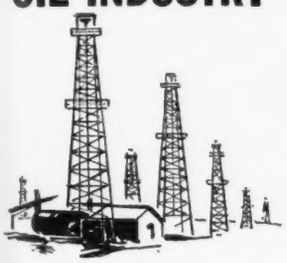
A number of rope-section renewals have been made and at present the rope has four 400-ft. sections and two shorter sections. Now if a section is to be replaced or spacings of some buttons corrected, only those on that section of the rope need be done as one week-end project. Contrary to the standard recommendation of using zinc and leaving the ends of the wires straight, the rope ends are socketed in the splice button halves by turning the ends of the wires back and filling the space with babbitt. Officials of the mine have more confidence in this latter method.

## *Pass It On*

Many find "Operating Ideas" one of the most interesting parts of the paper because it helps them at their daily job. Doubtless you have some unusual way of doing something to promote efficiency or safety, have devised a new tool for meeting one of the problems of your work or have hooked up your electrical equipment in some new way. COAL AGE would be glad to learn of this development. A photograph may aid in telling the story, and a sketch—however rough—will be welcome if it helps in understanding the idea. For each acceptable idea COAL AGE will pay $5 or more on publication.

# WANTED: More Wire Rope
## FOR ESSENTIAL WAR WORK

### OIL INDUSTRY



### LOGGING

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## Every Wire Rope User Can Help

YOUR wire rope is production equipment . . . a moving part subject to the same factors of wear and tear as that of any other operating machinery.

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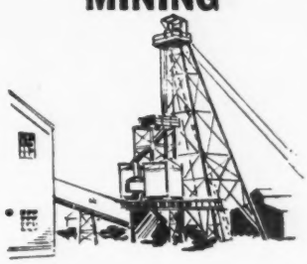
May we send you a copy of "Practical Information on the Use and Care of Wire Rope"?—no obligation.

The day after day performance record of "HERCULES" (Red-Strand) Wire Rope is demonstrating that it has what it takes to meet 1943 conditions. In "HERCULES" there is a "right" rope for every heavy duty purpose, as it is furnished in both Round Strand and Flattened Strand constructions—all of which are available in either the Standard or Preformed type.

### CONSTRUCTION

### MINING



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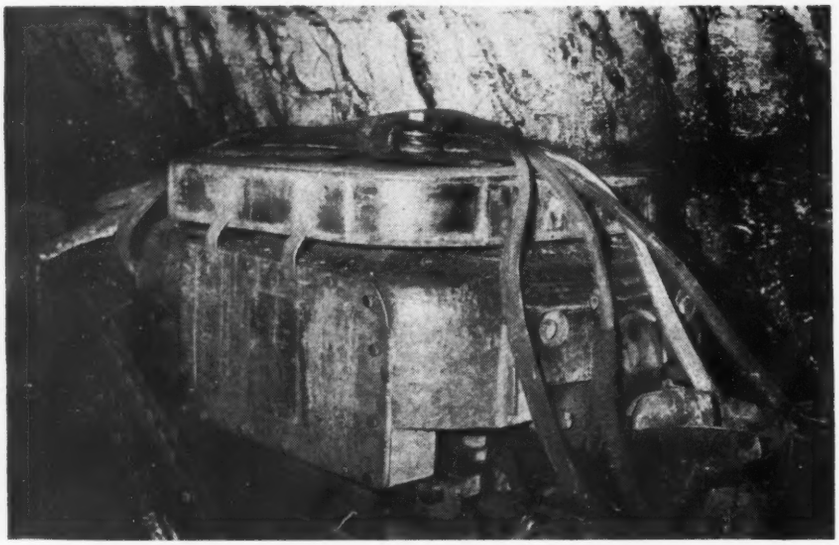
# Shortwall Water Tank Mounted on Motor



**Water tank permanently mounted on top of the motor box of a shortwall. This view shows the cable draped over it for tramming.**

DUST CONTROL begins at the principal source, the mining machine, in Powhatan mine of the Powhatan Mining Co., in eastern Ohio. In duckbill sections the water is piped to the face, but in a mobile loading section serviced by transfer cars (see article beginning p. 63 of this issue) tanks are mounted on the mining machines. The illustration shows the type of tank which has been adopted for the 35BB Jeffrey shortwalls which cut the narrow places.

This tank, mounted flat on top of the motor field frame, is 5½x27½x35 in. and holds approximately 23 gal. Construction is ¼-in. plate with arc-welded seams. The tank has a 3-in. filler hole with threaded plug in the center and for the discharge a 1-in. pipe connection at a front bottom corner. The water is gravity-fed and pours onto the ingoing side of the cutter chain. With a hand valve the rate is adjusted so a tankful lasts for two places. In this narrow work the machines cut six to eight places per shift so their tanks need be filled but three to four times. The gathering crew brings the water to the face in 5-gal. cans which are filled from a 3-in. line by the dumper at the transfer station.

Prior to the recent adoption of these tanks, a mobile tank car which was kept coupled to the shortwall truck was tried but discarded. It had a duct through the center and was fitted with rollers to accommodate the trailing cable. Adding the tank car complicated tramming, required trips to a pipe station for filling, introduced the complication of a hose; the gravity feed was not as satisfactory as it is from the small flat tank with short pipe connection and there was still the other disadvantage of high cost and requiring considerable material.

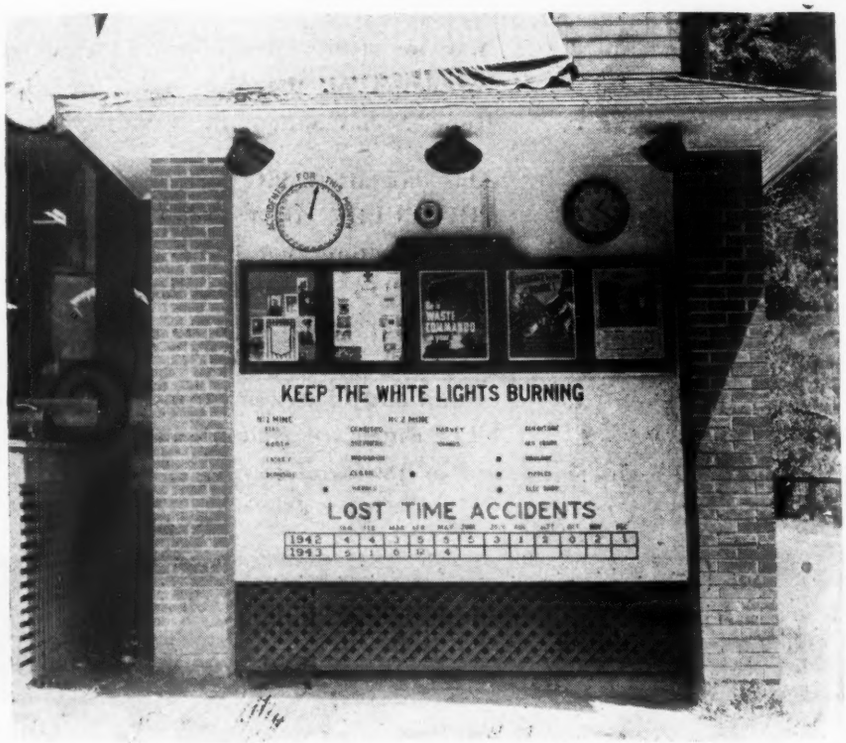
Officials of the company have observed that in this mine, which normally is quite dry, an excess of water causes a swelling of the fireclay bottom to such an extent that props are broken. This is not to be confused with props taking weight from roof action.

# Time, Temperature, Pressure Included on Safety Board

IDEAS THAT HAVE been worked out by other companies usually play a part in the design of safety boards. A look at a certain type of board can serve at least as the basis for a new layout intended to be different from the average or better suited to the local situation.

Herewith is shown an illustration of the board of the Princess Dorothy Coal Co. at Eunice, in Raleigh County, W. Va. The location of the board is at one end of the front porch of the retail store and office building. The location is just across the highway from the foot of the man-and-material incline serving the mines, which are drift operations high on the hill.

At the top of the board, between the accident clock and the electric clock, a barometer and thermometer are mounted so that anyone interested in the time, temperature or pressure will have a look. The accident clock consists of a pointer and 31 numerals around the dial. Under "Keep the Lights Burning" are the names of eleven section foremen and spaces devoted to General Outside, General Inside, Haulage, Tipples and Electric Shop. The white lamp opposite a foreman's name or opposite the name of a department is changed to red for the remainder of the month in case a man of that crew suffers a lost-time accident. Across the bottom is the monthly comparison of accidents during the current and past year.




**Accident records plus current information.**

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REDUCES WEAR BY REDUCING FRICTION

# MERRY CHRISTMAS

## LIKE SANTA WE'LL DO OUR BEST TO FILL EVERY REQUEST

MAY the Holiday Season be followed by better months to come and may victory and peace lead to normal and better conditions for all. During the year 1943, we, like yourselves, have had our problems, yet our first thought has been to serve you to the best of our ability . . . to give you the finest Chains, Bits and Cutter Bars our years of experience and skilled workers can produce. During the months to come we will redouble our efforts to work with you and for you. Like Santa, we'll do our best to fulfill every reasonable request. Merry Christmas and, we hope, a brighter New Year.

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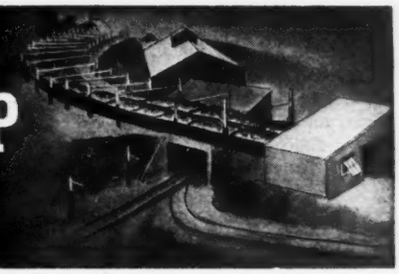
# COAL AGE NEWS ROUND-UP



# Coal Wrestles With Seizure Problems

***Ickes Signs Agreeements Following Seizure Nov. 1, But Application Proves Difficult—Operators Resume Negotiations But Ask Price Action — 43 Mines Returned, With Ickes Stating Agreement Will Hasten Process***

RENEWING conferences with the United Mine Workers in November after seizure No. 2 on the first of the month and subsequent signing of a wage contract between Secretary Ickes and the union, the bituminous operators of the country and various government agencies continued attempts to untangle the knotty problems involved in application of the government contract, necessary price increases and related questions growing out of seizure and the government's new venture into the field of contractual relations. Meanwhile, Secretary Ickes issued regulations for the operation of mines under government control and also returned the properties of 43 companies.

Seizure No. 2, precipitated by John L. Lewis' employment of an additional work stoppage (the fourth in 1943) to back up his demands for wage increases and other concessions, was ordered by President Roosevelt Nov. 1. The stoppage which resulted in seizure tied up practically all of the anthracite and bituminous mines of the country for a week or more, with a tonnage loss of over 12,000,000 in bituminous and 1,000,000 in anthracite.

### Agreements Signed Nov. 3

Moving quickly after the Presidential seizure order of Nov. 1, Secretary of the Interior Ickes took over all mining properties producing 50 tons or more daily and in a reorganization of the coal-mining set-up in the Department of the Interior named Dr. Charles J. Potter as both deputy coal mines administrator and deputy solid fuels administrator for war. On Nov. 3, Mr. Ickes signed wage agreements covering both the anthracite and bituminous industries, which agreements were approved, subject to clarification of certain points, by the War Labor Board on Nov. 5.

These new agreements, applying to all mines the terms of the Illinois agreement with additional payments of 37½ and 37.8c. daily by reducing lunch time 15 minutes, left WLB and other officials floundering in recriminations and explanations and posed a number of knotty problems in interpretation, including the question of portal-to-portal pay. As the month wore on, Mr. Ickes, disclaiming any thought of nationalizing coal operations, set up coal-operator advisory boards to handle both the application of the agreements and the operation of the mines. He made it clear that a price increase was necessary and also that an agreement between the operators and the miners would hasten the return of the properties.

While held to be within the terms of the government's wage stabilization program and the Little Steel formula, the new contracts, viewed as a victory for Lewis, resulted in a flare-up of demands from other union leaders for abandonment of Little Steel and the granting of wage increases, and in certain government moves that might forecast a relaxation of controls over wages. One such move was the appointment by President Roosevelt of a five-man board of WLB members Nov. 5 to investigate the cost of living.

The second seizure of the coal mines followed rapidly on the shutdown of the industry at midnight Oct. 31, a move already anticipated in a number of states by thousands of wildcat strikers. With the policy committee of the United Mine Workers, called to order in Washington Nov. 1 to consider the question of accepting or rejecting the Illinois wage decision handed down by WLB on Oct. 26, showing signs of filibustering, the President issued his seizure order late in the afternoon of Nov. 1. Salient provisions of the order were:

1. Effective date, Nov. 1, 1943, to run until no longer necessary for the furtherance of the war effort but in no event more than 60 days after the restoration of the productive efficiency of the mines.

2. Secretary of the Interior Ickes designated to take possession of and operate the mines.

3. Management permitted to "continue its managerial functions to the maximum degree possible."

4. Secretary Ickes authorized to request protection for men who return to work from the Secretary of War, if necessary.

5. Secretary Ickes authorized to offer miners a contract or contracts for the period of governmental operation based on the WLB opinion of Oct. 26 in the matter of the Illinois agreement, such contracts to be subject to WLB approval.

### Mines Taken Nov. 2

Except for the clauses on return, which follow the provisions of the War Labor Disputes Act, and authorization for the Secretary of the Interior to offer contracts to the union, the seizure order of Nov. 1 followed the line of the previous order of May 1. Acting immediately, Secretary Ickes notified the presidents of coal companies operating mines producing 50 tons or more per day on Nov. 2 that he was taking over. The text of the notification is as follows:

"By virtue of the authority vested in me by the President of the United States, I have signed an order taking possession of any and all the coal mines of your company. The primary object of government possession of the mines is the maintenance of full production of coal for the effective prosecution of the war.

"As chief executive officer of your company, you have been designated operating manager for the United States for each and all of its mines. Unless you advise me to the contrary within 10 days you will be deemed to have accepted that designation. You are being called upon as a loyal and patriotic American to serve as operating manager and to do everything possible to assure operation of the mines at maximum capacity.

"The Regulations for the Operation of Coal Mines Under Government Control, as amended (8 F.R. 6655, 10712, 11344), which I have issued heretofore, will be applicable to the present period of government possession, and operation of your mines should be conducted in accordance with the provisions of these regulations.

"All officials and employees of the company are to perform their usual functions and duties in connection with the mine

### 1943 INDEX

Index for the 1943 issues of *Coal Age*, January to December, inclusive, has been printed separately. A limited number of copies are available to subscribers who desire them. Requests should be addressed to *Coal Age*, 330 West 42nd St., New York 18, N. Y.

operations. The existing managerial set-up should be used as far as practicable. You should make every effort to encourage the miners to resume work under the present terms and conditions of work.

"Arrange immediately to fly the flag of the United States on the mining premises. Copies of a notice of government possession will be supplied you as soon as possible. You should display that notice conspicuously at each of your properties.

"Please fill in the form inclosed immediately, sign it, and return it promptly to the Department of the Interior, Washington 25, D.C."

Steps toward the signing of a government-U.M.W. wage agreement also got under way immediately. Previously, however, as a result of Lewis' contention that the WLB decision in the Illinois agreement constituted a "wage cut," President Roosevelt took a hand. In a letter to WLB Oct. 29, he suggested that the board consider a modifying clause to the effect that in no case would pay for a day's work under the new contract be less than previous pay. The board, which had been wrangling over the terms of the Illinois decision as a result of charges by certain labor members that its action had been influenced by some governmental officials and agencies, agreed to this suggestion and on Oct. 30 sent the following telegram to the Illinois operators and Lewis:

"In connection with its decision of Oct. 26, 1943, on the supplemental agreement between the Illinois Coal Operators' Association and the United Mine Workers of America, the National War Labor Board hereby advises all parties that it has no objection to the insertion of a clause in contract that in no case shall a miner receive for a day's work less than he would have received for his productive work at the straight-time hourly rate under the old contract."

Conferences between Secretary Ickes and Lewis culminated Nov. 3 in the execution of a "memorandum of agreement" reducing lunch time from 30 to 15 minutes and granting for that additional working time a payment of 37½c. per day (37.8c. in anthracite). This step, stated the memorandum, would result in an increase in annual production of over 20,000,000 tons of bituminous coal and 2,000,000 tons of anthracite. The text of the agreements is as follows:

"A. *In Respect to Bituminous Mines:*

"1. All of the provisions of the Illinois contract which were not disapproved by the War Labor Board in its decision of Oct. 26, 1943, shall become effective at the time stated in this agreement; provided, however, that Par. 13 of the Illinois contract shall not be applicable to the government.

"2. In applying the opinion of the War Labor Board to areas other than the Illinois area, the parties have assumed an average travel time throughout the areas of 45 minutes per day in accordance with the assumption by the War Labor Board in the Illinois case. This assumption is made solely for the purposes of this agreement and is limited thereto.

"3. The prevailing customary 30-minute lunch period is hereby reduced to 15 minutes and the mine workers agree to work said additional 15 minutes as productive time and shall be paid therefore on the basis of time and one-half or rate and one-half, as the case may be, and be made applicable to all existing rates effective in all bituminous coal districts. Using the Illinois basic rates purely for illustration, this is intended to provide a basic daily wage in that area of $8.50 a day.

"B. *In Respect to Anthracite Mines.*

"1. All of the provisions of the agreement approved by the War Labor Board in its directive order of Oct. 28, 1943, in the matter of the anthracite operators and the United Mine Workers of America, Districts 1, 7 and 9, are hereby made a part of this agreement.

"2. The prevailing customary 30-minute lunch period is hereby reduced to 15 minutes and the mine workers agree to work said additional 15 minutes as productive time and shall be paid therefor on the basis of time and one-half for each day worked. This is intended to provide, in addition to the increase approved in the War Labor Board order of Oct. 28, an increase of 37.8c. per day for all day and monthly men. All contract miners, consideration miners and contract mine laborers will receive an addition of 37.8c. per start. The proportion of the proper share of the increase for this 15-minute additional productive work in respect to contract mine laborers is to be paid by the operator in accordance with established custom and practice.

"C. *In Respect to Both Bituminous and Anthracite Mines:*

"1. This agreement is to cover all of the possessed coal mines which had contracts with the United Mine Workers of America for a period ending during the year 1943.

"2. It is expressly affirmed that both parties will take all appropriate steps to assure maximum safety in working conditions and will cooperate to that end.

"3. This agreement shall promptly be submitted, in accordance with the direction of the President, to the National War Labor Board for approval. Subject to that approval, this agreement becomes effective today."

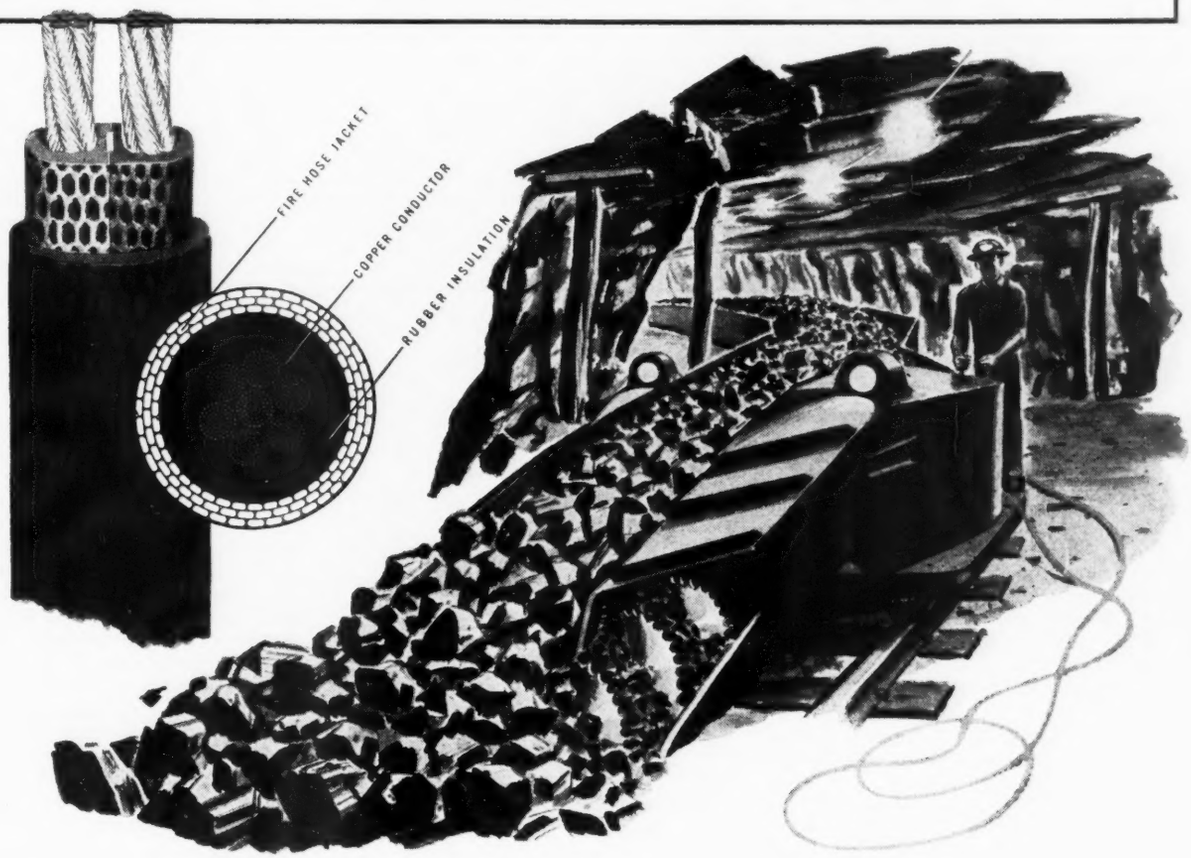
With the agreement signed, Secretary Ickes went before the U.M.W. policy committee to appeal for more production on Nov. 5. On Nov. 3, the committee sent out the following message to the miners:

"The government of the United States, through the Secretary of the Interior, has today executed a satisfactory wage agreement with the United Mine Workers of America, effective this date and continuing through the period of government operation of anthracite and bituminous mines.

"The policy committee by unanimous vote has approved this agreement and instructs all members of the United Mine Workers of America in mines now idle to resume production of coal at the earliest possible moment.

# Duracord

**the mining cable with a 20-year performance record . . . saves up to 50% rubber!**

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**ANACONDA WIRE & CABLE COMPANY**

"Your international officers and the members of your scale and policy committees of all districts urge immediate compliance with this contract and the fullest degree of cooperation to make it effective. Copies of the agreement and explanation of details will be promptly mailed.

"Let every member recognize that the nation's imperative need for coal requires the most prompt action in restoring the mines to full production."

Despite Lewis' belated recognition of the need for coal production, the miners were still somewhat slow in returning to work, and reasonably full-scale output was not achieved until several days later, Nov. 8, with a number of recalcitrants hanging on even longer.

### WLB Approves Agreement

WLB, which received the memorandum of agreement Nov. 3, took two days to approve it, in a resolution dated Nov. 5 as follows:

"*Resolution*—The National War Labor Board, acting on the authority vested in it by Executive Order No. 9017 of Jan. 12, 1942, the executive orders, directives and regulations issued under the Act of Congress of Oct. 2, 1942, and the War Labor Disputes Act of June 25, 1943, hereby resolves as follows:

"1. That the memorandum of agreement reached by the Secretary of the Interior and the United Mine Workers governing the terms and conditions of employment for the period of the operation of the coal mines by the government is hereby approved, subject to clarification and resubmission as to (a) the provisions for payment of tonnage or piece workers and (b) the application of the provisions as to pushing cars in places where it is impracticable to deliver the cars to the working places other than by pushing.

"2. That the President of the United States be notified of this approval in accordance with the provisions of Sec. 5 of the War Labor Disputes Act.

"3. That the fact of such approval and notification be transmitted to the Secretary of the Interior with the covering letter which has been prepared by the chairman and submitted to the board and is attached hereto."

Recommending the elimination of certain provisions of the Illinois agreement which it considered inapplicable to government operation, and recommending that Par. 14, dealing with the portal-to-portal question and settlement of pending claims and lawsuits, be limited to the following language: "The payments herein provided for shall be construed to be in full settlement and discharge of all portal-to-portal compensation," the board recommended that in areas outside Illinois the question of pushing cars be settled locally and that it be continued where it was otherwise impracticable to deliver them to the working places.

On the question of travel time, the board called attention to the fact that the 45-minute time was approved in the Illinois agreement only on the grounds that the operators and miners would give their best efforts to a reduction. The board also expressed itself as "very definitely of the opinion in the approval of any agreement that may be made between the operators and the mine workers the board should have more exact information as to actual travel time and also a concrete estimate of the possibilities of reducing travel time" as a means of determining whether payments are within the limitations prescribed.

The letter also requested clarification of the provisions for payment of tonnage workers, particularly in regard to travel time. "To make the same principle effective" (referring to payments for day men), the board said, "the travel-time rate for tonnage workers should apparently be but two-thirds of that specified in the Illinois agreement."

With Wayne L. Morse, WLB public member, filing the lone dissenting opinion and declaring that the contract was "the product of the use of economic action against the government and the nation" and should therefore be disapproved, and also charging that approval while a strike was on was against the settled principles of the board, the following few days were devoted to attempts by Secretary Ickes and WLB to justify the agreement, and also to attempts by all parties, including the operators, to find ways and means of meeting the problems in its application.

One knotty question which immediately arose was the status of the $40 payment provided in the Illinois agreement for settlement of back travel-pay claims. On the basis of the Government-U.M.W. contract of Nov. 3, which stated that this provision of the Illinois agreement "shall not be applicable to the government," many operators took the position that this provision was eliminated. The union, however, was of very much the opposite opinion, and issued a memorandum Nov. 9 stating that "each and every coal company which had an agreement with the U.M.W.A. in the period 1941-1943 and worked under the continuing terms of this contract, as amended by the WLB, up to Oct. 31, 1943, is liable for the $40 back 'portal to portal' payment, payable in four equal installments following the first day of the calendar month following the effective date of the U.S.-U.M.W.A. agreement."

Travel time would not be downed, however, and with the government disclaiming responsibility, it cropped up in several directions as the month wore on, along with the question of whether the extra wages to be received by the miners really represented working time in all cases. A number of operators in various fields, pointing to travel time substantially in excess of 45 minutes, protested that working time was no more and in a few cases less under the new arrangement. A number of such protests were received after Secretary Ickes, on Nov. 10, prescribed a 9-hour working day with the further proviso that "all men must go into the mine and emerge from the mine during this time." His instructions, however, included no method of computing compensation and did not refer to outside employees. It was expected that additional conferences with WLB would be necessary.

### Advisory Committees Named

To cope with the complications, Secretary Ickes, on Nov. 10, named anthracite and bituminous advisory committees "to advise and consult with the Secretary of the Interior and the Deputy Coal Mines Administrator with respect to the working out of the details concerning the terms and conditions of work in the coal mines under government possession in accordance with the memorandum of agreement entered into between the Secretary of the Interior and the president of the United Mine Workers of America on Nov. 3, 1943."

Named to bituminous committee were: Charles O'Neill, United Eastern Coal Sales Co.; R. L. Ireland Jr., Hanna Coal Co.; L. Ebersole Gaines, New River Co.; D. C. Kennedy, Kanawha Coal Operators' Association; D. A. Thomas, Southern Coal & Coke Co.; George F. Campbell, Old Ben Coal Corp.; K. A. Spencer, Pittsburg & Midway Coal Mining Co.; and Eugene McAuliffe, Union Pacific Coal Co.

Anthracite committee members are: W. W. Inglis, Glen Alden Coal Co.; R. E. Taggart, Philadelphia & Reading Coal & Iron Co.; and James H. Pierce, East Bear Ridge Collieries Co.

(*Continued on p. 108*)

## COAL ACTIVITY

### Bituminous Production

| | |
|---|---|
| October, 1943, net tons | 48,740,000 |
| P.c. change from Sept., 1943 | −6.0 |
| P.c. change from October, 1942 | −5.9 |
| Jan.–Oct., 1943, net tons | 489,550,000 |
| P.c. change from Jan.–Oct., 1942 | +1.4 |

### Anthracite Production

| | |
|---|---|
| October, 1943, net tons | 5,331,000 |
| P.c. change from September, 1943 | −2.1 |
| P.c. change from Oct., 1942 | +3.9 |
| Jan.–Oct., 1943, net tons | 51,239,000 |
| P.c. change from Jan.–Oct., 1942 | +0.7 |

### Bituminous Coal Stocks

| | Thousands of Net Tons, Oct. 1, 1943 | —P.C. Change— From Sept. 1, 1943 | From Sept. 1, 1942 |
|---|---|---|---|
| Electric power utilities | 18,722 | −0.8 | −5.8 |
| Byproduct coke ovens | 6,591 | −3.2 | −37.6 |
| Steel and rolling mills | 940 | 0.0 | −24.9 |
| Railroads (Class 1) | 13,511 | +0.9 | −0.2 |
| Other industrials* | 27,496 | −3.8 | −14.0 |
| Retail dealers | 5,606 | −17.3 | −44.3 |
| Total | 72,866 | −3.2 | −5.1 |

### Bituminous Coal Consumption

| | Thousands of Net Tons, Sept., 1943 | —P.C. Change— From Aug., 1943 | From Sept., 1942 |
|---|---|---|---|
| Electric power utilities | 6,970 | +0.7 | +23.1 |
| Byproduct coke ovens | 7,609 | −2.0 | +4.3 |
| Steel and rolling mills | 865 | +0.8 | +11.6 |
| Railroads (Class 1) | 10,487 | +1.0 | +10.8 |
| Other industrials* | 11,837 | +0.6 | 0.0 |
| Retail dealer deliveries | 11,342 | +17.3 | +57.8 |
| Total | 49,110 | +3.7 | +16.3 |

*Includes beehive coke ovens, manufactured-gas plants and cement mills.

### Sales, Domestic Stokers Vs. Oil Burners

| | Stokers | Burners |
|---|---|---|
| September, 1943 | 2,293 | 624 |
| P.c. change from Aug., 1943 | −17.5 | −31.4 |
| P.c. change from Sept., 1942 | −74.9 | −81.4 |
| January–September, 1943 | 19,337 | 12,702 |
| P.c. change from January–September, 1942 | −74.1 | ..... |

### Index of Business Activity*

| | |
|---|---|
| Week ended Nov. 13 | 235.9 |
| Month ago | 238.8 |
| Year ago | 217.7 |

**Business Week*, Nov. 20.

### Electric Power Output†

| | |
|---|---|
| Week ended Nov. 13, kw.-hr. | 4,483,000,000 |
| P.c. change from month earlier | +2.3 |
| P.c. change from year earlier | +18.7 |

†Edison Electric Institute.

# MISSING

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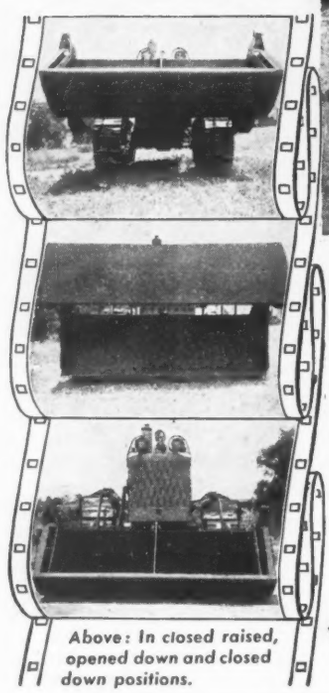

Above: In closed raised, opened down and closed down positions.

Top: Loading material. Center: Dumping material. Bottom: Special snow bucket.

Fits in anywhere . . . everywhere! No limit to its applications. Does the work of a bulldozer, shovel, scraper, tamper, grader, maintainer, hoist, clam, snow-remover. Uproots and carries stumps and trees, lays pipe, tile or cable, spreads gravel, digs ditches and trenches. Cuts smoothly while it travels . . . carries or floats loads . . . levels as it fills. Ability is PROVED on toughest jobs. Now serving the armed forces in tough jungle fighting, on sanitary fill work, filling bomb-craters, airport construction, etc. Figure on it for your Post War work. Investigate NOW! Write for literature.

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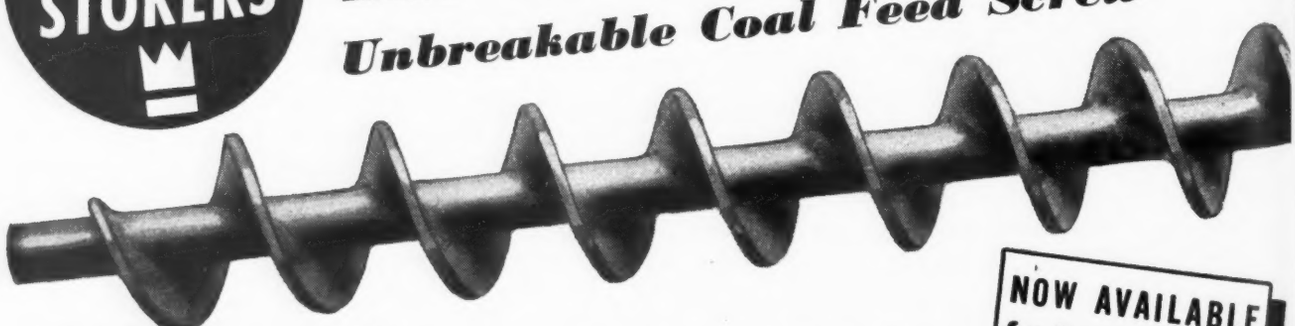

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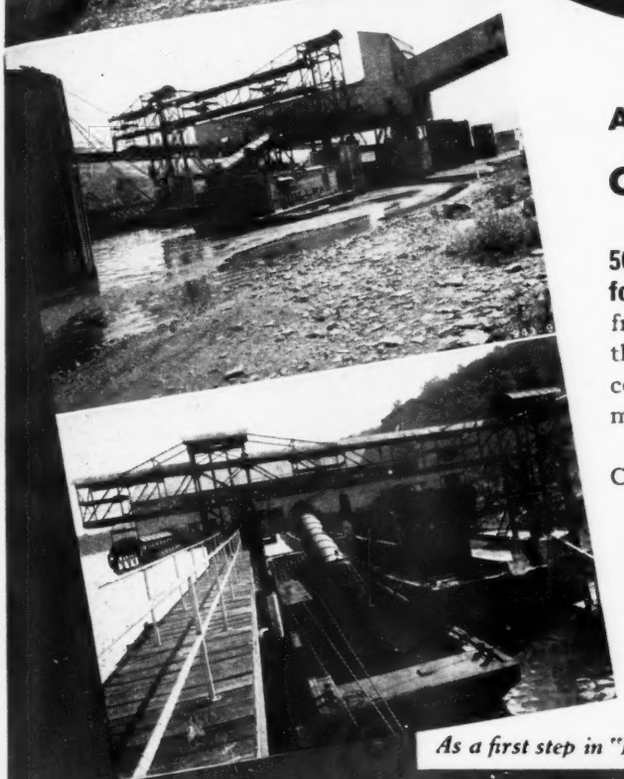

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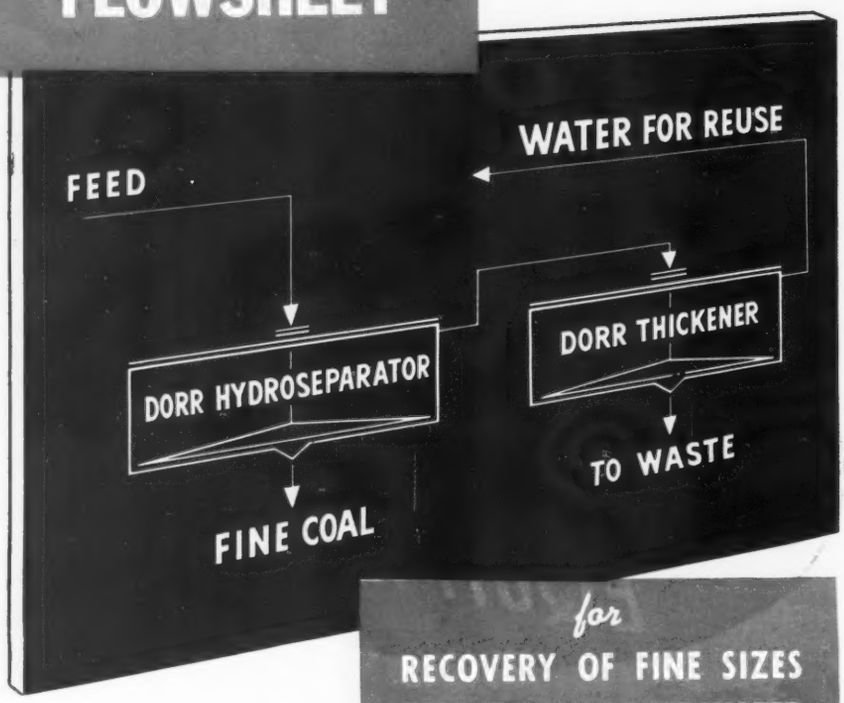


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**RECOVERY OF FINE SIZES**
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Recovery of fine sizes and of waste water for reuse plus the elimination of your stream pollution problem can be simply and economically effected by the flowsheet above employing Dorr equipment. Here are the results obtained by one coal producer—with a Dorr Hydroseparator, a Dorr Thickener and this same flowsheet.

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Both committees immediately went into conference with Solid Fuels and Coal Mines Administration heads.

Apparently feeling the need for further justification of their action approving the Nov. 3 agreement, three WLB public members declared that payment of $1.50 more per day was within the purview of the national wage stabilization policy. Their opinion went on to say that the issue of non-compliance with the board's June 18 directive in the Appalachian case "had become blurred and confused" and that rejection of the proposed agreement would have been a "resort to technicalities in the face of a national crisis." Stating that travel-time payments still promised trouble, the opinion pointed out that possible recrudescence of the issue, "together with the shock experienced by the whole country as a result of the United Mine Workers' defiance of the no-strike pledge, must of necessity bring into the forefront of consideration and discussion the whole question of the responsibility of unions for anti-social acts and of the capacity of the government as at present constituted to prevent such acts." In a further opinion along somewhat similar lines, three industry members declared that they wished "at this time, to strongly urge the necessity of immediate consideration by Congress of legislation to amend existing laws in order to require responsibility of unions and to provide additional protection for workers, employers and the public against those who misuse the power presently permitted."

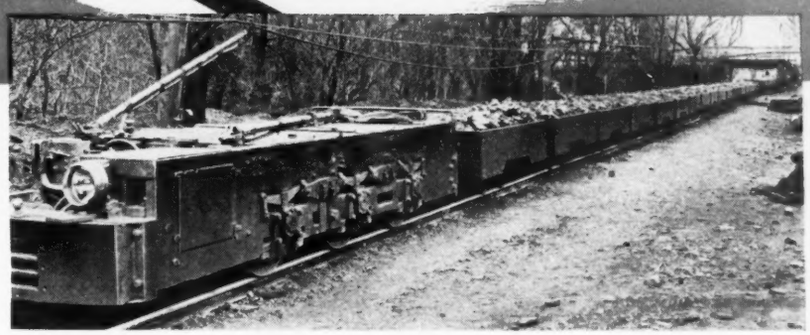
### President Approves Agreement

The Nov. 3 agreement was approved by the President Nov. 12. He also took cognizance of the travel-time question and appointed a committee, as suggested in the WLB letter accompanying the contract approval of Nov. 5, to investigate and determine the facts as to travel time. Members of the committee are: Morris L. Cooke, Philadelphia, Pa., a member of WLB, representing the public; R. L. Ireland Jr., Hanna Coal Co., for the operators; and Thomas Kennedy, secretary, for the United Mine Workers.

While the debates were proceeding in Washington, various portal-to-portal pay suits were proceeding on their way through the courts. On Nov. 1, the New River Co. filed its answer to the suit by its employees in the U. S. district court for the southern district of West Virginia. A few days later, in the Jewell Ridge Coal Corp. suit in Virginia, the United Mine Workers filed an amended reply waiving all claims for travel time prior to April 1, 1943. The case went to trial Nov. 17, at Roanoke, Va. Previously, the New River and Semet-Solvay suits were continued indefinitely by Judge Ben Moore, Charleston, W. Va., pending the outcome of the Jewell Ridge case. On Nov. 15, the Supreme Court agreed to hear the Alabama iron-mining case. Earlier (Nov. 3), government attorneys filed a brief supporting portal-to-portal pay in this case.

Material designed to clarify the points in the Nov. 3 agreement on which WLB desired additional data was submitted to the board Nov. 13 in a letter by Secretary Ickes. On payments for travel time and

# For Low Cost Coal Haulage...



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•

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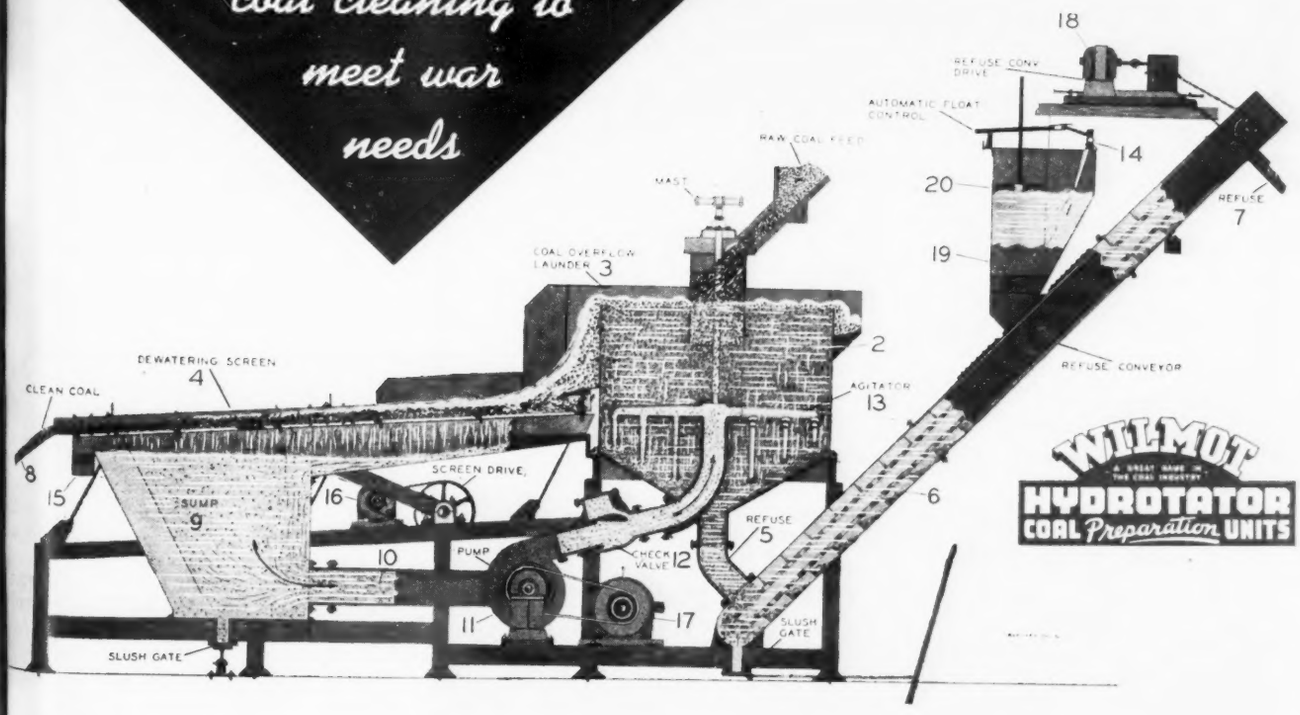


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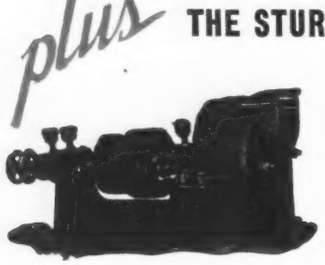
*plus* **THE STURTEVANT *FINE* GRINDER**



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time over 40 hours per week, the Secretary stated that the basis in the case of tonnage and piece workers would be average earnings per hour plus one-half for time over seven hours per day and 40 hours per week. On the car-pushing question, any controversies are to be settled by the operating managers in accordance with customary grievance machinery; also pushing will be subject to local negotiations and will not be prohibited where it is impracticable to deliver cars otherwise.

On the subject of portal-to-portal pay settlements, and particularly the $40 allowed in the Illinois agreement, the provisions of the Illinois agreement are not applicable to the government, Mr. Ickes stated, "provided, however, that the compensation paid under the memorandum of agreement between the Secretary of the Interior and the United Mine Workers of America dated Nov. 3 shall be construed to be in full settlement and discharge of all portal-to-portal compensation for the period of government possession covered by the memorandum of agreement." Secretary Ickes further expressed the opinion that settlement of the portal-to-portal question between the operators and union was essential for maximum production.

A signature on a contract or contracts, the Secretary made clear Nov. 15, is a very probable requisite to return of the mines. This statement was made at the first meeting of a group of approximately 30 coal-company presidents and coal-mine owners called in for the purpose of discussing problems relating to the operation of coal mines in government possession. The group was made up largely of the same men who were called in after Seizure No. 1 on May 1.

### Ickes Asks Contract

Stating that he was, as always, uncompromisingly opposed to nationalization, but that he could not afford to subject the nation to the dangers of a fifth strike in wartime, the Secretary said that "if the operators were to negotiate a contract with the mine workers and the repetition of the work stoppages was thus rendered improbable, it would seem clear that the government could immediately turn back the mines."

Conferring after the Secretary had transmitted his message, the advisory group submitted on Nov. 16 a written memorandum covering "factors in this situation for which the government and government policy are alone responsible and which are beyond any control by the operators individually or in the various districts," despite their anxiety "to insure a full and dependable production of coal." The factors listed were:

1. Governmental policy has resulted in a situation where governmental limitations as to both wages and prices have been made binding on the operators but not on labor. "This factor alone has resulted in the failure to negotiate contracts or have them become effective when negotiated.

"2. The government form of agreement has, from a practical standpoint, established a basic rigid formula that has made impossible any general elasticity in approach on the usual give-and-take in wage negotiations. . . ."

"3. Without adequate price adjustment, many operations will doubtless be unable to provide indefinitely the losses incidental to federal control and policy and may be compelled to close down unless the government provides current funds or otherwise assumes current pecuniary responsibility. It is difficult to believe that delay in adequate price adjustment will not result in substantial curtailment of production."

"4. The operators are in unanimous agreement that the responsibility for adequate price adjustment rests with the government and that differences of opinion and theory as between the various government agencies acting in the matter cannot relieve the government either of responsibility or of pecuniary liability for the increased cost resulting from government directives not reimbursed by current price adjustment.

"5. We are convinced that the inconsistent theories of increased production may prove in actual operation to have been seriously over-estimated by all the government agencies handling the matter. The operators wish to express the deepest concern over the failure of the controlling agencies of government to coordinate those controls in a manner that will insure the necessary price adjustments to take care of enforced increases in cost and protect production. It is certain that control of these factors has been taken entirely out of the hands of the industry."

"6. The bituminous mining industry has in existence the necessary machinery for dealing with wage contracts. These representatives are available. This is a highly technical problem. It is made more technical and difficult by reason of the intervention and confusion of governmental policies as to stabilization and prices. The industry considers that its established agencies for such matters are the ones to advise with you during federal control and with respect to wages looking to return of the properties. The owners are most anxious to cooperate but cannot too definitely emphasize the fact that production cannot be increased or even maintained unless the controlling governmental policies make that course possible. Nor can there be effective and intelligent action by industry with respect to the federal-control wage contract until this governmental confusion is removed and the meaning and application of the contract itself are made more understandable."

### Operators Meet With Union

With Ickes' reiterating his desire for a resumption of contractual negotiations, conferences got under way with union representatives at the New Interior Building, Washington, D. C., Nov. 17. On that same day, Ickes returned the mines of 43 companies which had not had stoppages and were not expected to have in the future. While the meeting between operators and union found only a few districts on hand at its opening, signs were that it would take on a national character before it was over. Among those in attendance the first day were representatives of Illinois, Indiana and central and western Pennsylvania. The captive mines were not represented, although it was stated when the various questions of governmental juris-


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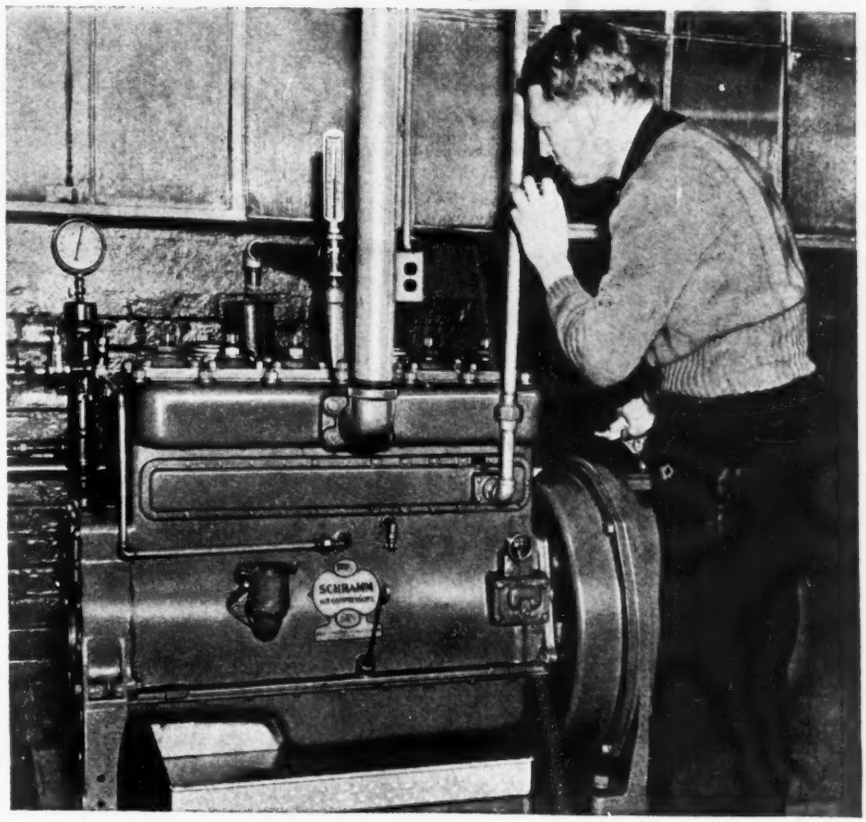


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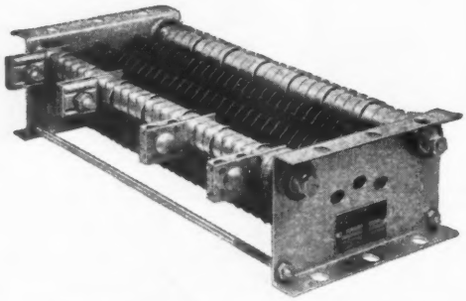

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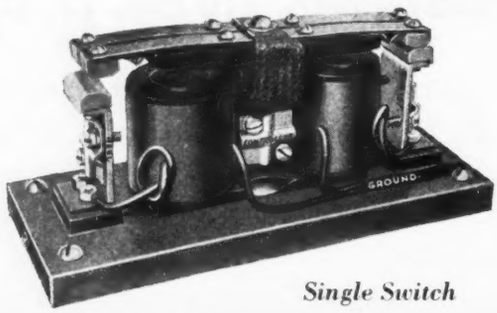


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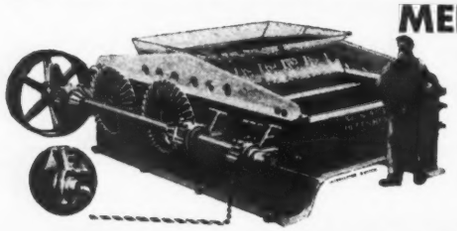

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diction were solved they would "do everything within their power to conclude this extended controversy." The Southern Coal Producers' Association, also not present, announced that its members would be ready to discuss the matter after WLB had clarified the government agreement then before it. Clarification and prices, it was brought out, were the major problems awaiting solution before the operators felt that they could get anywhere on a new contract.

### Counter-Proposal Offered

With the northern Appalachian operators and Indiana, Illinois and other regions farther west, representing about half the bituminous tonnage, expressing a willingness to sign the modified Illinois agreement on Nov. 23, the southern Appalachian and Alabama operators offered a counter-proposal of eight hours of work at the face plus $2.57½ weekly "for the inconvenience of traveling" to bring the base weekly earnings up to $57.06½ made possible by the U.S.-U.M.W. agreement. Lewis, however, sticking to the original version, stated that signing with half the industry was not satisfactory, and negotiations therefore continued.

Enlargement of the conference was the goal of a request from Secretary Ickes to absentee members on Nov. 24. The appeal was made to 21 owners on patriotic grounds, including captive operators, and met with immediate response. As a result, practically the entire bituminous output was represented when the conference reconvened Nov. 26.

### OPA Bucks on Prices

On the price front, Secretary Ickes declared upon taking over the mines that a price increase would be necessary. However, he and OPA failed to see eye to eye on what the increases should be, with OPA inclined to cut the proposed figures down to something more to its liking. OPA also announced that it would not authorize adjustable billing or retroactive prices to compensate for the increased cost accrued under the Nov. 3 agreement. This situation was responsible for a letter to Fred M. Vinson, Director of Economic Stabilization, from a bituminous subcommittee Nov. 18. Reciting the confusion and failure to agree among the various agencies, as well as the committee's failure to secure an appointment with him, the committee declared that delay in establishing new and adequate maximum prices might result in a situation where "the producers of 40 percent of the nation's coal tonnage will fold up."

"The owners," the letter continued, "are willing to cooperate with the Secretary and with all agencies of the government in bringing about the earliest practicable determination of the actual increase in cost resulting from the U.S.-U.M.W.A. contract or referable to any other policy which may be imposed on operation during federal control. They must, however, notify all agencies that they are under no obligation to accept in advance the results of any of the inconsistent guesses and underestimates now in process of leisurely discussion and debate between these agencies.

"You should be advised that not one of

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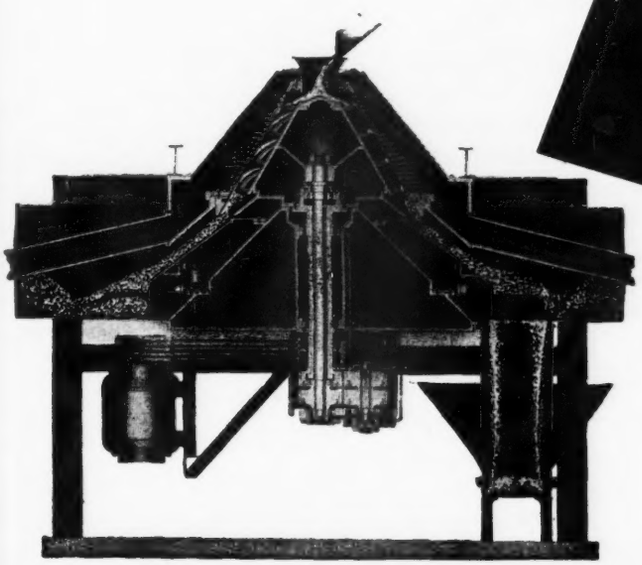

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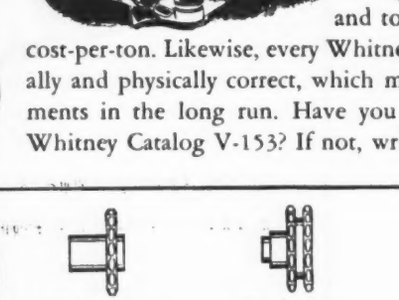

Whitney Drive and Conveyor Chains have the extra toughness it takes to keep mining machinery operating at top capacity . . . and to keep down overall cost-per-ton. Likewise, every Whitney Part is dimensionally and physically correct, which means fewest replacements in the long run. Have you a personal copy of Whitney Catalog V-153? If not, write for it today.

Whitney Part S-24062, Conveyor Main Drive Sprocket 15-T—No. 140.

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*Hartford 2, Connecticut*


the owners represented by this committee or known to its members considers that any unit in the industry is committed to the financing, results, losses or increased cost of federal operations under the conditions now existing.

"It is the belief of the committee that the delayed and unsatisfactory action with reference to price adjustment, already announced by OPA as to accrued increases and indicated as to the belated price adjustments being considered by OPA, not only requires that the owners of the properties and funds relied on for the conduct of federal operations take steps to protect their basic rights as to these properties or their own funds but makes it impossible for the owners of many mines, producing in the aggregate a substantial tonnage, to continue financing losses or increased cost during federal operations beyond the first pay day.

"We believe we have the right to ascertain definitely from you whether OPA will, by proper order, protect the actual increases in cost from Nov. 1, when and as definitely determined. If not, it will be necessary to ask the Secretary of the Interior to assume and provide for the full increased cost in some adequate manner. We are sending him a copy of this memorandum."

The price situation, it was reported, was responsible for closing the mines of the Elk Horn Coal Corp., in eastern Kentucky, Nov. 10. W. W. Goldsmith, receiver, was reported as stating that the company had no funds to take care of losses that would be incurred under present price ceilings, and therefore was shutting down until proper action was forthcoming. On Nov. 16, Mr. Goldsmith announced that the properties would resume on the strength of negotiations with OPA promising an adequate increase in prices.

### Price Increases Granted

OPA finally came through on prices on Nov. 24 and 27, announcing, on the latter date, a "temporary" hike in bituminous ceiling prices averaging 17c. per ton over the nation. The increase was authorized by Director of Economic Stabilization Vinson.

The anthracite increases authorized Nov. 24, to be effective that date, averaged 62c. per ton to June 1, 1944, then decreasing to about 34c. per ton. By sizes, the increases were:

| | Present Ceilings | New Ceilings to March 31, 1944 | New Ceilings After June 1, 1944 |
|---|---|---|---|
| Broken, egg, stove, chestnut | $7.30 | $8.00 | $7.70 |
| Pea | 5.75 | 6.45 | 6.15 |
| No. 1 buckwheat | 4.20 | 4.80 | 4.50 |
| Rice | 3.35 | 3.85 | 3.60 |
| Barley | 2.50 | 2.85 | 2.70 |
| Smaller than barley | 1.80 | 2.15 | 2.00 |

WLB action on the clarification of terms submitted by Secretary Ickes in his letter of Nov. 13 came out on Nov. 20. The board adopted a "minor" qualification which cut the basic weekly wage 30½c. from that provided in the agreement, and otherwise approved the clarification provisions. What the board did was rule that overtime after 40 hours per week, being mostly travel time, should not be

figured on the basis of time and one-half at the regular straight-time hourly rate of $1, but on the composite hourly rate of 97.14c. In response to a question as to whether eight hours of work at the face would be obtained, WLB Chairman Davis replied: "I'm not operating the mines. And I'll ask you one—do you think Mr. Ickes will get eight hours?"

Immediately upon receipt of WLB approval, Ickes, at 7 p.m. Nov. 20, released a memorandum to "all operating managers for the United States for bituminous coal mines" summarizing the terms and conditions of employment in properties in government possession. He set the work day for all inside employees at eight hours and 45 minutes, including 45 minutes traveling time, with an intermission of 15 minutes, not to be paid for, for lunch. For outside employees, including strip-mine and coke-oven employees, the work day was set at eight hours and 15 minutes, seven hours at straight time and one hour and 15 minutes at time and one-half. For outside employees whose normal work day previously had been eight hours, the new work day was set at eight hours and 35 minutes, eight hours at straight time and 35 minutes at time and one-half at hourly rates based on a seven-hour day.

### Start at Portal

The work day, the instructions stated, shall begin at the portal and end there for all inside employees, except in shaft mines, where man trips shall leave the bottom 10 minutes after the start of each 8¾-hour shift and arrive there five minutes before its end.

"All inside employees working on a day-wage basis shall be paid the established hourly rate provided in the applicable district or other agreement, as amended by the directive order of the National War Labor Board dated June 18, 1943, in the Appalachian Dispute (Case No. 111–1284), and subject to the increase provided in Par. 6 below, at straight rate for eight hours of productive time in each day during the week (assuming 45 minutes travel time for each day) and at a special rate equivalent to two-thirds the established regular hourly rate for the assumed 45 minutes of travel time in each day; *provided, however,* that time and one-half the regular established rate shall be paid for that portion of the productive time worked during the first five days in the operating week after 40 hours have expired (assuming 45 minutes travel time for each day); *provided further,* that for all productive time worked in the sixth operating day in each week, time and one-half the regular established hourly rate shall be paid; and *provided further,* that time and one-half the special rate for travel time (equivalent to two-thirds of the regular established rate) shall be paid for all travel time after 40 hours have expired in the week (assuming 45 minutes travel time for each day). This paragraph is not to be construed to require payment of time and one-half on Saturday if the individual mine worker has voluntarily laid off on Monday, Tuesday, Wednesday, Thursday or Friday of the week. In no case shall the payment of overtime be pyramided."

"For all tonnage and piece workers in the bituminous coal mines, the parties have assumed an average travel time throughout all areas of 45 minutes each day. The compensation for all such workers shall be computed as follows:

"The average rate of earnings per hour for productive time for each individual mine worker shall be determined by dividing the total earnings for that mine worker at the existing regular established rates for all tonnage produced and yardage or dead-work done during the week or pay period by the number of hours worked at the face that week or pay period (assuming 45 minutes travel time for each day). This average rate of earnings shall then be paid to the mine worker for all hours of productive time worked in the week (assuming 45 minutes of travel time for each day); *provided, however,* that one and one-half this average rate of earnings shall be paid to the mine worker for all productive time worked after 40 hours have expired in the week (assuming 45 minutes travel time for each day).

"A special travel-time rate equivalent to two-thirds of the average rate of earnings per hour shall be paid for the assumed 45 minutes of travel time in each day; *provided, however,* that one and one-half this special travel-time rate shall be paid to the mine worker for all travel time after 40 hours have expired in the week (assuming 45 minutes travel time for each day).

"The man-trip motor crew is to be paid straight time for the first seven hours worked and rate and one-half for all other time worked over seven hours."

Par. 6 referred to previously applies to the increases in rates provided by WLB for able-bodied trappers, flaggers, switch-throwers, greasers and slate pickers. In addition to other provisions governing remission of charges and other practices previously prescribed by WLB, the instructions included a number of samples of how to compute earnings.

While operators and government agencies were struggling with the application of the government contract, similar conferences were being held on anthracite problems. Like the bituminous group, anthracite operators stated their willingness to resume conferences with the United Mine Workers on a new contract, although no date was set up to Nov. 23. Meanwhile, they prepared to make the retroactive payments prescribed in the WLB decision of Oct. 28 (November Coal Age, p. 97), amounting to 32.2c. per man per day for a period of six months. The first payment will be made in December and the second and third in February and April, 1944.

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## Coal's Manpower Need Explored by WMC

Manpower to meet 1944's coal requirements of 686,000,000 tons was the subject of a meeting of War Manpower Commission representatives from all the principal coal-producing states in Cleveland, Ohio, Nov. 5–6. Recruiting of additional workers, absenteeism, turnover and wages were among the reported topics of discussion.

Figures made public as the conference began in the regional WMC headquarters showed a very sharp drop in total employment in the nation's mines in the past 22 months. Total employment in bituminous mines has dropped from 473,000 in January, 1942, to 393,000 at present. Total employment in anthracite fields dropped from 98,000 to 76,000 in the same period, it was reported.

The decline is continuing at an average rate of 7,400 a month. Selective Service is responsible for about 2,800 withdrawals monthly. The other men quitting work are going back to their farms or are entering industry.

To meet the 686,000,000-ton production goal in 1944, 76,000 additional workers will be needed by bituminous mines by March, 1944, the conference was told. The anthracite mines must have 9,000 additional workers to meet the 1944 output goals.

Most acute needs were said to be in the Rocky Mountain mines and the Appalachian field. It was pointed out that strikes in the coal industry have cut deeply into 1943 production and that any loss in output this year due to these labor troubles must be made up during the winter months when demand is at its peak. Federal officials attending the conference said their objective is to avert a fuel crisis which will become critical early in 1944 unless the additional manpower can be recruited at once.

To meet their fuel quotas in the coming year, it was brought out that the principal coal-producing states need men immediately as follows:

| State | Estimated Miners Needed |
|---|---|
| Pennsylvania | 21,500 |
| West Virginia | 10,500 |
| Kentucky | 6,000 |
| Alabama | 3,600 |
| Virginia | 3,300 |
| Arkansas-Oklahoma | 2,600 |
| Ohio | 2,400 |
| Colorado | 1,400 |
| Wyoming | 1,300 |
| Utah | 1,000 |

The United States Employment Service offices throughout the country now have more than 27,000 unfilled orders for miners, it was said.

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## Mine Being Opened By West Gulf

Construction work is now going forward on a new mine being opened by the West Gulf Coal Co., on the main line of the Norfolk & Western Ry, five miles from Mullens, W. Va. The company's headquarters are in Mt. Hope, W. Va., with P. M. Snyder Jr. as president and DeWitt Snyder as secretary-treasurer. The company is reported to have leased some 2,000 acres of land containing an average of 42 in. of Beckley-seam coal. Grading for the railroad siding and tipple now is under way. Because of the steel situation, the tipple will be of wood construction with a capacity of about 1,000 tons per day. Underground operations will be largely mechanical. Eric George, formerly with the Lillybrook Coal Co., is in charge of construction and will be superintendent.

# Seizure Tightens Distribution Controls

## *Freezing and Restriction of Retail Deliveries Follow Seizure and Then Are Relaxed—New Delivery Restrictions Set up to Equalize Stockpiles*

SEIZURE of the nation's coal mines the second time Nov. 1 and the work stoppages which preceded and followed it brought a flurry of government orders on coal distribution, most of which were later either repealed or modified. One exception was SFA Regulation No. 10 providing limitations on shipments of coal produced in Districts 1 to 13, with the exceptions of 5 and 12. Meanwhile, the Senate moved to centralize all coal functions in the hands of the Solid Fuels Administration.

Changes in Interior Department personnel were another development of early November. Leading the list was the resignation of Howard A. Gray, deputy solid fuels administrator for war. T. J. Thomas, associate deputy, also resigned and with him, Beryl Brown, his assistant. Commenting on Mr. Gray's resignation, Secretary Ickes declared that "he has long desired to retire but agreed several months ago to remain until the coal situation was settled. With the restoration of production, I can comply with Mr. Gray's desire to retire."

Mr. Thomas, who joined the government's solid fuels staff early in 1942, later becoming associate deputy solid fuels administrator, took among his major responsibilities the task of building up the country's stockpiles. He returns to his positions as president of the Valier Coal Co. and assistant to the president of the Burlington R. R. Upon Secretary Ickes' insistence, however, he remains on the Secretary's personal staff as a consultant.

Charles J. Potter, Indiana, Pa., succeeded Mr. Gray as deputy solid fuels administrator and also was named deputy coal mines administrator Nov. 10. Mr. Potter previously had been assistant deputy solid fuels administrator in charge of production and distribution, and before that had been with the Bituminous Coal Producers' Board for District 3 and assistant to the president of the Rochester & Pittsburgh Coal Co.

### November Orders

Government directives on distribution as a result of stoppages and seizure, in the order of their issuance, were:

Oct. 29—Secretary Ickes issues orders to create a pool of domestic sizes of anthracite and bituminous to meet critical needs. Coal producers were directed to hold all loaded cars of such coal on mine tracks for movement to critical shortage areas. On the same day, at the request of SFA and ODT, the I.C.C. embargoed all shipments of barley and small anthracite. This order (No. 162) was set aside effective Nov. 1 to permit SFA to take care of distribution of this coal by directives.

Oct. 30—Ickes prohibits delivery of anthracite to any domestic consumer having a supply of 10 days or more. The regulation (SFA No. 6) also prohibited dealers from delivering and consumers from accepting more than ½ ton per delivery.

Nov. 2—Ickes orders frozen, in addition to supplies on mine tracks, some 2,000,000 tons of bituminous coal in transit. Retail dealers and others selling in less than carload lots were forbidden to deliver and consumers from accepting bituminous coal unless the consumers had less than 10 days' protection (Regulation No. 7). Deliveries of not more than 1 ton each to householders with these minimum stocks were permitted. On the same day, the Secretary appealed to coal dealers and consumers for cooperation in the prevention of suffering and set up five new field offices for emergency distribution—Altoona, Pa.; Pittsburgh, Pa.; Fairmont, W. Va.; Washington, D. C.; and Birmingham, Ala.—in addition to existing SFA offices in Cleveland, Ohio; Cincinnati, Ohio; Kansas City, Mo.; Denver, Colo.; and Seattle, Wash.

Nov. 5—Ickes releases approximately 125,000 tons of bituminous coal to shortage areas.

Nov. 6—Anthracite frozen on mine tracks and bituminous frozen in transit released by Ickes. The total included approximately 2,000,000 tons of bituminous and 150,000 tons of anthracite. Bituminous frozen on mine tracks was still held for emergency distribution.

Nov. 9—All remaining emergency controls over the transportation of coal released by Ickes (Order No. 10), including remainder of approximately 700,000 tons of coal frozen on mine tracks.

Nov. 9—OPA authorizes regional administrators to adjust ceiling prices of operators producing less than 50 tons per day to meet "local shortages."

Nov. 10—Emergency regulation governing retail distribution of bituminous coal revised for more flexibility. Days' supply beyond which deliveries to householders would be forbidden was raised to 30. Consumers other than householders were permitted to receive deliveries to bring their supplies up to 30 days. No special restriction was placed on quantities which might be delivered to householders with less than a 30 days' supply on hand.

Nov. 17—SFA issues Regulation No. 10, effective Dec. 1, providing for limitations of shipments and more equitable adjustment of stocks in the hands of consumers. This regulation, since it incorporated the requirements of Order No. 5, superseded that order, as well as Regulation No. 4, as amended, except for Sec. 602.42. Regulation No. 4 applied to limitations on stocks of coal produced in District 8.

Regulation No. 10 limits shipments of coal produced in Districts 1 to 13, inclusive, except Districts 5 and 12, and was designed, among other things, to curtail shipments to consumers with large stockpiles and consequently release coal for consumers with small reserves to meet requirements for immediate consumption and at the same time increase their stocks to a level adequate to meet emergency situations.

To the extent indicated by a "Stock Limitation Table," purchases of coal by various classes of consumers are limited upon the basis of days' supply on hand. Exceptions are: purchases of coal by retail dealers and its sale by them, vessel and bunker fuel, quantities of less than 50 tons or a carload per month, purchases by certain dock operators (who continue to be subject to previous regulations), special-purpose coals for byproduct and metallurgical coal, and purchases by the War and Navy departments, War Shipping Administration, Maritime Commission, Lend-Lease Office, and Office of Economic Warfare. Coal ordered by a government contractor is subject to the regulation, however.

Filing of data required for distribution was covered in Regulation No. 10, along with a time table for serving orders on producers. No change in operating practices is required by the regulation, which also provides an exemption from liability for breach of contract resulting from compliance with its provisions.

Nov. 18—Secretary Ickes takes over entire control of anthracite distribution to small and large consumers of domestic sizes in twelve northeastern states and the District of Columbia from OPA to centralize authority in one place. Users of less than 12 tons per year prohibited from receiving a delivery if they have over 2 tons on hand, with a limitation of 2 tons on an individual delivery also, dealers to give priority to consumers with less than 1 ton on hand. Consumers using over 12 tons of these sizes in a year were prohibited from accepting deliveries which would give them a supply of all solid fuels of more than 30 days, although within that limitation no restriction was placed on the size of a delivery. Preference is to be given to consumers with less than 10 days' supply on hand.

Nov. 20—Shipments of coal to the lakes from Districts 7 and 8 stopped to release supplies for rail movement to all distress points.

### No Coupons This Winter

Whether the loss of tonnage growing out of the stoppages before and after Nov. 1 might result in a change in OPA's attitude of no coupon rationing this winter, as announced Oct. 23, was not officially commented upon in November, but efforts to promote conservation, efficiency in use and substitution of other types and sizes of coal continued under added pressure. Meanwhile, Ickes clashed sharply with Harry M. Vawter, general manager of Bituminous Coal Institute, on bituminous supplies. Claiming that the government was in error on existing reserves, Mr. Vawter pointed out that in addition to a visible stockpile of 75,000,000 tons.

there was some 25,000,000 tons in transit and consumers' basements. Ickes declared that SFA had been warning consumers that the supply was growing less abundant every day "so they might take reasonable precautions to conserve what supply they have on hand." He declared that "our deficit by the end of next year would increase by 40,000,000 tons."

### Big Saving Possible

On the anthracite front, Secretary Ickes late in October revealed that SFA had issued a circular showing anthracite users, especially in New England and along the Atlantic Seaboard, how to fire bituminous coal. In a plea for conservation Nov. 4, E. H. Walker, public relations director, Anthracite Industries, Inc., told the New Jersey Retail Solid Fuel Dealers' Association that regardless of what happens at the mines, 5,000,000 tons of anthracite can be added to the nation's supply for domestic heating this winter if consumers and dealers will cooperate to see that all domestic heaters are in good repair and properly fired.

SFA, on Nov. 15, set minimum quality standards "to assure that Pennsylvania anthracite sold for domestic use under present distribution limitations is useable." This quality standard, the first by SFA, "prohibits producers and wholesalers from shipping and retail dealers from delivering hard coal which contains more ash by weight on a dry basis than the following percentages: broken, egg, stove, chestnut and pea, 15 percent; No. 1 buckwheat, 16 percent; and No. 2 buckwheat, 17 percent." On domestic sizes, the standards became effective Nov. 21; on Nos. 1 and 2 buckwheat, Dec. 11. Ash contents provided by SFA are higher than those established by the industry, but were "designed so as not to prevent the marketing of any hard coal which is deemed to be usable during the period of critical shortage of this fuel."

### Ask Coal and Oil Move

Congressional moves to remove coal and oil from OPA jurisdiction resulted in the introduction of S. 1530, referred to the Committee on Interstate Commerce, and action in the House on a similar proposal revolving around the Disney bill to place control of oil prices in the hands of Secretary Ickes, to which it was planned to add an amendment to include coal.

The Senate bill would centralize governmental functions relating to the production, transportation, distribution, sale or price of petroleum or natural gas and coal, and with respect to the latter would provide (Sec. 2) that "all functions of the following agencies relating to the production, transportation, distribution, sale or price of coal are hereby transferred to and vested in the Solid Fuels Administration for War: (1) the Office of War Mobilization and the Director of War Mobilization; (2) the Office of Economic Stabilization and the Director of Economic Stabilization; (3) the War Production Board and its chairman; (4) the Office of Price Administration and the Price Administrator; (5) the Office of Defense Transportation; (6) the National War Labor Board."

## Six-Months' Basis For Materials

Along with higher ratings for non-serialized mines, the WPB Mining Division moved in November to put quotas for maintenance and repair materials and operating supplies for mines on, in effect, a six-months' basis. This was done by extending to each serialized operation a quota for the first quarter of 1944 and simultaneously authorizing the same quota for the second quarter. Advance authorization also is given for purchase of up to 80 percent of the first-quarter quota for third-quarter delivery and 60 percent for the fourth quarter.

Paper work is reduced by making it unnecessary to file applications for second-quarter quotas. Where the assigned quotas prove inadequate, supplemental applications may be filed as heretofore—before March 1 for the first quarter and June 1 for the second. To take care of the additional adjustments of this type, operators are instructed by the Mining Division to return any unneeded allotments at the earliest possible date, using CMP 32, to fill the urgent needs of other mines. Purchases by mines and smelters operating under P–56 and P–73 continue to be handled through the Mining Division and may not be made under CMP Regulation 5.

The preference rating assigned to non-serialized mines for maintenance, repair and operating supplies was raised for A–2 to AA–5 in an amendment to Order P–56, effective Oct. 29. Such mines will continue to apply to the Mining Division for capital equipment, using Form WPB–2910, and to the same division for additional assistance where an AA–5 rating may not be adequate.

The Mining Division announced the "establishment of a new streamlined mining division of the War Production Board in the Denver regional office with far-reaching authority to render production service" to metal mines, smelters and coal mines in the western States. "It creates in Denver and eight western field offices, all easily and quickly accessible to mining men, a central organization empowered to help mines and smelters with daily war-production problems." However, handling of quotas for maintenance, repair and operating supplies, and applications for new equipment, will continue to be processed by the Mining Division in Washington.

Other developments in November brought out that despite WPB's much-advertised decentralization work, the relation of the mining industry to WPB is not changed, as it will continue to function through the Mining Division in practically all respects, including the processing of applications for construction, especially underground construction.

Continued progress was made in removing the application of "L" and "M" orders to mines in November, and it is expected that additional steps will be taken by the end of the year to clarify the industry's status with respect to such orders. In fact, developments could be summed up by the statement that the industry should continue to address the Mining Division on all material or equipment requirements until specifically notified otherwise.

Reports were that the decentralization program would affect allocations of controlled materials (steel, copper and aluminum) to some 75 percent of the mining-machinery manufacturers whose requirements currently are being handled through the Mining Division. How the decentralized procedure would work was a matter of speculation depending upon experience.

An urgent plea for used earth-moving equipment for shipment to coal-stripping projects in the British Isles was issued by WPB's Construction Machinery Division Nov. 20. "The machines urgently needed are 250 diesel or steam-powered shovels and draglines of 1½ cu.yd. capacity or more and 100 diesel-powered tractors with scrapers and bulldozers. Coal-mining experts have estimated that the shipment of this machinery, which will occupy some 20,000 tons of cargo space, will save 15,000,000 tons of coal-shipping space this year and at the same time will help ease a major drain on the tight coal situation in this country." Equipment available should be offered for sale through the Procurement Division of the Treasury Department, acting as lend-lease purchasing agent.

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## River-Movement Tax Asked by Kentucky

Tax troubles were brewing in November for coal, oil and other river-transportation companies through action started by the law firm of Smith & Leary, Frankfort, Ky., back-tax collectors, to collect alleged back levies on river-operating companies as taxes on boats, barges, landing equipment, etc. The step was taken under a program whereby counties bordering on the Ohio River would tax such companies for State, county and school purposes.

Kentucky has jurisdiction over the Ohio to the low-water mark on the north bank, and contends that it has the right to tax river-transportation companies at a rate of $1.80 per $100 of valuation. Four suits now being brought name the Island Creek Fuel & Coal Co., Hatfield-Campbell Creek Coal Co. and its subsidiary, the Ohio & Kanawha Transportation Co., and the Ohio River Co., and call for a total of $250,000 in back taxes over a period of five years. The suits also set the stage for annual state levies of around $50,000 if the claims to such taxes can be maintained. Counties in whose behalf the suits are being brought include Jefferson, Campbell, Kenton, Mason, Boyd, Greenup, Lewis, Bracken, Pendleton, Boone, Gallatin, Carroll, Trimble and Oldham.

Should the State's position be upheld, similar actions will follow from counties on the lower river to its mouth. The petitions contend that "continuous or habitual use and operation of the property in Kentucky establish for them a taxable service in this State." It is further claimed that the properties on which the taxes are sought are not now under any tax jurisdiction.

# Coal and War West Virginia's Theme

## *Future Equipment Prospects, Manpower Needs, How to Reduce Bumps and Public Relations Highlight 36th Meeting of West Virginia Institute*

WHEN TO PLACE orders for equipment wanted late in 1944, changes in mining plans to reduce the possibility of bumps in cover exceeding 500 ft., the effect of the war on West Virginia fatalities, manpower needs of the services vs. coal-mine requirements, and public relations for coal mining were among the highlights at the 36th annual meeting of the West Virginia Coal Mining Institute, held at the Daniel Boone Hotel, Charleston, W. Va., Nov. 12-13.

In attendance were R. Crawford, chief mechanization engineer, and G. M. Harvey, chief electrical inspector of mechanication, British Ministry of Fuel and Power. John T. Sydnor, president, Rail & River Coal Co., Bellaire, Ohio, and retiring institute president, was on deck with the new president, D. L. McElroy, chief engineer, Consolidation Coal Co. R. H. Morris, general manager, Gauley Mountain Coal Co., Ansted, W. Va., presided Friday afternoon; C. W. Connor, vice president, Colcord Coal Co., Montcoal, was toastmaster at the dinner that night; and Carel Robinson, consulting engineer, Charleston, presided Saturday morning.

Instead of one principal speaker at the dinner, nine men were called on for short talks: C. E. Lawall, president, West Virginia University; Homer A. Holt, former governor; Jesse Redyard, chief, Department of Mines; Lee Pennington, executive assistant to J. Edgar Hoover; Messrs. Crawford and Harvey from England; Marcellus H. Stow, deputy director, mining division, WPB; Harold B. Wickey, technical adviser on priorities, WPB; and C. C. Dickinson, president, Black Band and Dixport coal companies and Leevale Collieries, Inc.

### Federal Actions Deplored

Strong resolutions were adopted deploring the actions of federal bureaus and agencies in "failure to apply and enforce the laws of our country impartially and justly against those who are responsible for curtailing production of coal." It was voted to send these to the President, to agencies in Washington and to members of Congress from West Virginia. "We deprecate," read another resolution, "the sudden and wholesale return of 1,700 mines under the first government seizure to their lawful owners, all at one time and many of them without request, as a loading of the gun wherewith the leaders of the miners' union could and did hold up the government . . . the property owners and the consuming public without being subjected to the penalties of the Smith-Connally Act."

R. Crawford, speaking at the dinner, told of a remarkable increase in production that an English mine has experienced by going back to room-and-pillar work from longwall. His job is to get some of the old and inefficient equipment out of the mines and get in new. During December, delivery is expected on the first of some shortwall mining machines English made from American plans.

Better than a 4 per cent increase in tons per fatal accident under wartime operation of coal mines in West Virginia was reported by Mr. Redyard in a paper delivered at the opening technical session. The study compared two years, 1940 and 1941, with the period 1942—first six months of 1943. The tonnages per fatal accident were 401,735 and 429,586. Mr. Redyard did not place significance on the decrease in fatal accidents but on the fact that there has been no increase.

**First-session speakers and pilots: Col. Harry H. Thompson, Cloyd M. Smith, Jesse Redyard, G. W. Spindler, John T. Sydnor and R. H. Morris**

The percentages of accidents in the various classifications, such as falls of roof, haulage and electricity have not changed materially during the 3½-year period of the study. One type of haulage accident has increased, however, that being wrecks or collisions of mine locomotives or cars. Wrecks of this type numbered five in 1940, 11 in 1941, six in 1942 and nine in the first six months of 1943. Mr. Redyard conjectured that these may be due to replacing experienced men by less experienced. Few fatalities resulted from the wrecks but they were potential causes of fires and explosions.

Comparisons were made of yearly periods during the two world wars. In West Virginia in 1918, the tonnage was 224,670 tons per fatality and in 1942 412,507. For incorporation into the proceedings of the institute, Mr. Redyard promised a study of accidents over the same period on the man-hour-exposure basis. The rapid shift to mechanical mining in the state is offsetting the manpower shortage so effectively that the quota of 160 million tons for 1942 will be met. Up to Oct. 1, production from West Virginia totaled 120,295,857 tons. Production from strip mines in the state increased 140 per cent in 1942 over 1941.

In discussion, Veleair C. Smith, consulting engineer, Charleston, warned that the impact of the loss of maintenance men is just now beginning to be felt and a breakdown in maintenance greatly increases the danger of accidents. The responsibility and worry of a new job, together with long hours, may result in mental fatigue which can increase minor accidents.

"Coal Before the Public" gave Cloyd M. Smith, editor of *Mechanization*, an opportunity to discuss the "plague of books and articles written for popular consumption." Speaking of "Coal & Men," by McAlister Coleman, which came off the press last month, he said: "Its strong labor slant suggests a sponsorship aimed to bolster the position of the United Mine Workers of America before the public."

"What the USA Is Worth," in the August issue of the *American Magazine*, and "Crisis In Coal," *Collier's* Sept. 4, both by Harold L. Ickes, also were analyzed by Dr. Smith. In arriving at a worth of 12 trillion odd dollars, Mr. Ickes included coal which, in Dr. Smith's opinion, "won't be mined for a millennium at today's f.o.b. prices" but forgot the wealth in the soil and all crops. He expressed the opinion that the Secretary wrote the article "as spokesman for an administration which wants to alibi a threatening national debt."

Anent Mr. Ickes' proposals for a large-scale government-operated hydrogenation plant to manufacture gasoline from coal, Dr. Smith pointed out that the methods are already in use in Europe, the coal is here and "we can bring them together tomorrow if we want to." He said that he would rather see the work carried on by the coal industry itself and that history shows that private capital is readily available when the time is ripe. He saw Secretary Ickes "straining at the leash to put government into business."

Some good points were admitted for the Sept. 25 Saturday Evening Post article "Is

**Second-session speakers and pilots: standing, left to right, H. B. Wickey, R. E. Sherwood, Marcellus H. Stow, Charles T. Holland, C. W. Connor; seated, Carel Robinson, D. L. McElroy and G. W. Spindler.**

the Coal Crisis Permanent," by Thomas T. Read, Vinton professor of mining engineering, Columbia University. The principal fault Dr. Smith found with this article was the impression given that the industry has gone very little into mechanized mining rather than the reverse of rapid and extensive use. Dr. Smith closed his paper with a brief picture of the coal industry as he sees it, recommending the "1943 Fourth Quarter Forecast" by Appalachian Coals, Inc., as "solid meat without hoopla, froth or foam."

Exception to Dr. Smith's lack of enthusiasm for the immediate possibilities of hydrogenation of coal was taken by Mr. Smith. He warned that all fuels are competitive, that in some territories gas is being depleted and that it costs a tremendous figure to transport gas long distances, for instance from Texas to northern West Virginia or Pennsylvania. He sees the answer in gas from byproduct coal.

W. E. E. Koepler, secretary, Pocahontas Operators' Association, paid tribute to *Coal Age*'s work in giving a true picture of the industry's problems and called attention to the well-financed Bituminous Coal Institute, which he predicts is going to do a real job.

Carl Scholz, consulting engineer, Charleston, advised the younger operators not to be too discouraged by the present goings-on in Washington. Many years ago, Congress proposed to pass a law limiting the number of shots per day in a mine to one.

Besides requesting coal operators to release single men up to 25 and married men of the same age bracket without children, Col. Harley H. Thompson, occupational adviser, State Selective Service, urged that no time be lost in submitting 41A requests for deferment instead of waiting until the man has been put into 1A. That may save a lot of work for the local boards, the examining doctors and for the state laboratory, which is hard pressed.

### Where Men Have Gone

Release of men from above-ground jobs should bring cooperation from the local boards in preserving the underground. The new critical list, however, does include the underground miner and therefore he cannot be taken away. A study, according to Colonel Thompson, shows that relatively few of the men who have left the coal mines have been inducted into the armed forces but instead are lost to other industries. He strongly urged that operators tighten up to eliminate transfers from one mine to another. Regarding absenteeism, he advised releasing a few of the worst offenders to the local boards and noting the effect. Jesse V. Sullivan, secretary, the West Virginia Coal Association, said that the figures which the Colonel gave did not include the many who volunteered before their call.

"Some Aspects of Violent Failure of Coal Mine Pillars and Adjacent Rocks" was the subject of a 21-page paper presented by Charles T. Holland, assistant professor, mining engineering, School of Mines, West Virginia University. During the eight years and nine months over which records have been available on these bumps in West Virginia, 42 fatal accidents have occurred, accounting for 1.96 percent of the mine-injury deaths in the area of 10 or 11 counties where the bumps have taken place. The counties and numbers of deaths are: McDowell, 19; Logan, 7; Raleigh, 4; Wyoming, 3; Mingo, Fayette and Kanawha 2 each; Clay, Boone and Mercer, 1 each.

The bumps generally occur only under cover of 500 ft. or more. With cover of 1,000 to 1,500 ft. and 40 to 50 per cent of the coal removed, an average stress of 2,500 to 3,500 lb. per square inch may exist in the coal remaining as pillars. Laboratory tests show that the strength of coals lies between 1,100 and 7,000 lb. per square inch when tested in 3-in. cubes. Strength of a pillar, however, starts at a comparatively low value for a cubical block having edge dimensions equal to the thickness of the bed and increases to higher values as the ratio of pillar width to thickness of pillar increases.

Based on that ratio, Professor Holland showed how splitting of pillars instead of recovery by slabbing weakens them and thus increases the likelihood of bumps. The elasticity of the coal makes it possible to store large quantities of energy and tests indicate that as much as 85 percent of this energy is released when failure occurs. Some of the objectionable mining practices which have been associated with failures are: (1) too much coal removed in advance mining, (2) pillars left not of uniform size, (3) irregular withdrawal of pillars, leaving points projecting from pillar lines or leaving pillars in the gob, (4) pillar lines in different sections moving in opposite directions passing each other, (5) pillar lines starting in the same general locality and then moving in opposite directions, (6) splitting pillars on projecting points or pillars too close to the line.

Longwall with pack walls is the mining method which best meets requirements for preventing bumps but generally is not adaptable to conditions existing in West Virginia mines. But, said Professor Holland, "the mining system, however, can be designed to simulate this type of longwall as closely as possible. Actually, many of our mines today are using room-and-pillar or block systems of mining which, except for the pack-wall requirement, are very closely akin to retreating longwall." Cooperation of the coal operators in reporting and making studies of all bumps was requested by Professor Holland, as it is by experience that conclusions can be drawn that may be valuable.

While the speaker intimated that slower extraction is generally indicated as preferable from the standpoint of minimizing bumps, W. N. Clagett said that in the Pocahontas field recent instances under 1,500 ft. of cover indicate that rapid extraction is best.

Coal is taking the opposite slant, that is shifting towards the critical in metals now that "the battle of production is about

## W. VA. OFFICERS

President—D. L. McElroy, chief engineer, Consolidation Coal Co., who succeeded John T. Sydnor, Rail & River Coal Co., Bellaire, Ohio.

Vice presidents — Laurence Tierney, Eastern Coal Corp.; Joseph Pursglove Jr., Pursglove Coal Mining Co.; J. J. Foster, Island Creek Coal Co.; William Findlay Jr., Simpson Creek Collieries Co.; R. H. Morris, Gauley Mountain Coal Co.

Secretary-treasurer—G. R. Spindler, assistant director of mining extension, West Virginia University, Morgantown, W. Va.

Executive board—Jesse Redyard, West Virginia Department of Mines; C. W. Connor, Colcord Coal Co., W. G. Crichton, Johnstown Coal & Coke Co.; T. E. Johnson, Northern West Virginia Coal Association; John T. Sydnor, Rail & River Coal Co.

won," said Marcellus H. Stow, deputy director, mining equipment division, WPB. Although the manufacture of coal mining machinery has been raised to the level of military equipment, there is to be considered the effect of sending machinery overseas to boost production there and save bottoms in shipping coal.

Although painting a brighter picture for our mines in securing materials during 1944, Mr. Stow said that a few of the items that go into new machinery are still hard to obtain. Decentralization, as Mr. Stow sees it, will have little effect and none adverse on the mining industry of the United States. He understands that the coal operators in general prefer the centralized control in Washington. His division is making every effort to simplify procedure and speed deliveries.

In discussion, H. B. Wickey, technical adviser on priorities, urged operators to get their orders in now for new machinery required for the latter part of 1944. He asked cooperation in furnishing more details to the purchasing agents for use in requesting materials and equipment, thus saving correspondence and time. He also advised close study on the part of the operator to strike a balance between the advantages of standardization, with slow delivery, and accepting some other type machine which may be available a lot sooner.

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## Illinois Group Scans Dedusting, Cleaning

Dedusting of coal and washing in two types of equipment were the subjects of the Oct. 19 meeting of the Illinois Society of Preparation Engineers and Chemists, held at the Benton Country Club, Benton, Ill.

"The dedusting of coal," said T. L. Garwood, assistant superintendent in charge of preparation, New Orient mine, Chicago, Wilmington & Franklin Coal Co., stems from other industrial processes, as the separation of grain from straw and chaff in the threshing of wheat. The Orient equipment employs an upward current of air in conjunction with a feed blast for removal of dust, such as 48-mesh, which is collected in a cyclone separator and/or dust bags.

One of the good points of air blasting the coal feed is that the fine particles which adhere to the coarser coal are jarred loose. There is a definite limit to the amount of surface moisture permissible on coal to be dedusted. Wet coal cannot be dedusted by air. Neither can wet fine coal be screened the normal way. The only successful method of screening fine wet coal is to add enough water to wash it through the screen.

The calcium chloride washer was explained by J. W. MacDonald, chief engineer, Old Ben Coal Corp. The unit is a cell containing a solution of calcium chloride agitated by motor-driven propellers and further by the movement of an inclined conveyor. Separation of refuse is accomplished by a combination of specific gravity and current. Cost of washing 6x3-in. coal is about 10c. per ton. Power required is about ¼ hp.-hr. per ton of coal. Equipment for coal under 1½ in. is in process of development, and a tandem unit, water in the first cell and calcium chloride in the second, is available. Results include less than 1/10 percent sink in washed coal at 1.40 gravity, with 7 percent of float in the reject, equivalent to about 0.4 percent of the raw feed.

Some features of the Chance cone when used in washing Illinois coal were detailed by Lee Hazen, preparation engineer, Pyramid Coal Corp. Sand consumption, he stated, is 3 to 4 lb. per ton of coal in the plant in question.

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## Illinois Society Hears About Rubber

A verbal picture of the synthetic rubber situation in the United States was given by E. J. Davis, St. Louis sales manager, Gates Rubber Co., at the Nov. 4 meeting of the Mining-Electrical Group of Southern Illinois, held at the West Frankfort (Ill.) Country Club.

Commenting on the tire situation, Mr. Davis gave little immediate encouragement. Tires from reclaimed rubber are not satisfactory. Recapping an old but sound carcass gives much better results. For the latter, 3,000 to 5,000 miles may be expected, driving at 35 m.p.h. On the other hand, old-tube stock makes very good rubber.

In the prewar period, tires were made at the rate of about 50,000,000 a year. For the current year that is cut to 10 percent of the usual production. But tire rationing has gone on at approximately five times production rate.

The synthetic rubber production program is getting into stride, Mr. Davis declared. Compared to the prewar natural-rubber consumption of 650,000, 1943 will reach a rate of 800,000 tons for synthetic rubber and 1944 1,300,000 tons. War requirements will take most of this.

Six or eight types of synthetic rubber are produced from numerous basic materials, and the types vary widely in their characteristics and the applications for which they are suited. Although some synthetic rubbers have characteristics that natural rubber is largely devoid of, as neoprene, no artificial rubber has yet been produced that has as broad applications as the natural product. The best artificial rubber for tires so far produced is Buna S. There is a wide variation in the various synthetic rubbers and a wide range in cost.

A major feature of the program was a war-action movie put on by C. C. Butterworth, plant engineer, Curtiss-Wright Air Co., St. Louis, Mo. It included pictures from the London and Coventry raids, air battles over the Channel and the attack on Pearl Harbor.

The officers for the year 1943-44, elected at the previous meeting are: president, Ralph Kidd, chief electrician, Valier Coal Co.; vice president, E. W. Stewart, storekeeper, Freeman Coal Mining Co.; secretary, Fred W. Richart, *Coal Age;* treasurer, Frank McKemie, electrician, Old Ben Coal Corp.

## Preparation Facilities

REPPLIER COAL Co., Buck Run, Pa.—Contract closed with Wilmot Engineering Co. for one 6-ft.-diameter Wilmot Hydrotator to prepare 20 t.p.h. of clean No. 4 coal.

JERMYN GREEN COAL Co., No. 14 Colliery, Pittston, Pa.—Contract closed with Wilmot Engineering Co. for one Type D Simplex jig, feed capacity 20 t.p.h. broken coal; one Type D Simplex jig, feed capacity 20 t.p.h. egg coal.

SUNSHINE COAL Co., Trevorton, Pa.—Contract closed with Wilmot Engineering Co. for one Type A Simplex jig, feed capacity 15 t.p.h. egg coal.

LECKIE SMOKELESS COAL Co., Anjean, W. Va., contract closed with Kanawha Mfg. Co. for Kanawha-Belknap washer, capacity 60 t.p.h. stove coal, raw coal conveyor, feeding washer and product chutes.

ISLAND CREEK COAL Co., Holden, W. Va., Mine No. 14 contract closed with Kanawha Mfg. Co. for car handling equipment consisting of loaded-trip feeder, empty-trip feeder and Thrustor-actuated bumper stop.

TRUAX-TRAER COAL Co., Rose Mine No. 2, Kayford, W. Va., contract closed with Kanawha Mfg. Co., for head house and rope-and-button conveyor, capacity 250 t.p.h.

WADDELL COAL Co., Winton, Pa., contract closed with Deister Concentrator Co., for three SuperDuty diagonal-deck coal washing tables for cleaning rice, barley and No. 4 buck.

RUBIN COAL Co., Forest City, Pa., contract closed with Deister Concentrator Co., for one SuperDuty diagonal-deck No. 7 coal washing table for barley.

JONATHAN COAL MINING Co., Barry, Pa., contract closed with Deister Concentrator Co., for one SuperDuty diagonal-deck coal washing table for cleaning fine sizes.

ST. CLAIR COAL Co., St. Clair, Pa.—Contract closed with the Wilmot Engineering Co. for revamping of breaker for the preparation of steam sizes of coal with Wilmot Hydrotators, conveyors and other equipment, including addition of two bents to the present breaker to provide for these machines. Cleaning equipment will be as follows: one 7-ft. Hydrotator, 60 t.p.h. of No. 1 buckwheat; one 7-ft. Hydrotator, 50 t.p.h. of rice; one 8-ft. Hydrotator, 60 t.p.h. of barley; one 7-ft. Hydrotator, 35 t.p.h. of No. 4.

LANDENE CORP., Hauto, Pa.—Contract closed with the Wilmot Engineering Co. for complete new preparation plant to prepare bank coal. Total feed capacity will be 2,000 tons per 7-hour day. In addition to a Chance cone for prepared sizes, Wilmot conveyor, rolls and shakers, cleaning equipment is as follows: one 3½-ft. Hydrotator, 20 t.p.h. No. 1 buckwheat; one 3½-ft. Hydrotator, 15 t.p.h. of rice; one 6-ft. Hydrotator, 30 t.p.h. of barley; one 7-ft. Hydrotator, 35 t.p.h. of No. 4; one 16-ft. classifier, 35 t.p.h. of No. 5.

# Mining Problems Analyzed by Illinois

***Wartime Work of the Health and Safety Service, U.S. Bureau of Mines; the Advantages of Big Cars Behind Loading Machines; Development of Strip Shovels; and Safety to Conserve Manpower Feature Illinois Meet***

**B. E. Schonthal, re-elected secretary-treasurer, with the new president of the institute, B. H. Schull, Pyramid Coal Corp.**

WITH A registration of 365, war activities of the health and safety service, U. S. Bureau of Mines, results from new methods of underground haulage, development of stripping shovels and plans for conserving manpower featured the 51st annual meeting of the Illinois Mining Institute, held at the Abraham Lincoln Hotel, Springfield, Ill., Nov. 12. L. W. Baldwin, chief executive officer, Missouri Pacific Lines, analyzed the wartime accomplishments of the railroads and their peacetime objectives at the annual dinner. The toastmaster was T. J. Thomas, president, Valier Coal Co., Chicago. Just back from his tour with the Solid Fuels Administration to resume his duties as Valier president and assistant to the president, Burlington R. R., although still retaining a government connection as consultant on Secretary Ickes' personal staff, Mr. Thomas pointed out that heavier demands and reduced stocks made conservation and maximum production the first order of business for coal mining.

Activities of the health and safety service of the U. S. Bureau of Mines in connection with the war was the subject of the first paper at the morning session. The service, said Dan Harrington, its head, has been entirely on war work for more than a year.

The subdivisions of this service are: safety, health, coal-mine section, explosives control and mineral resources. Of these, the inspection of coal mines was reluctantly taken on. Explosives control is a war activity which the army wanted put on a military basis rather than the voluntary control under which it functions.

Mr. Harrington stated that 200 lives have been saved annually through the service's educational activities in which 500,000 have taken courses and 1,000 communities are served every year. The requests are more than the ability to serve.

Office and field research in dust, humidity and gases has resulted in the development of dust respirators. Analyses of dust and mine air run to as many as 5,000 and 15,000 samples a year, respectively. This division of the service, with but 40 men, is doing much work investigating fires and explosions on incoming and outgoing ships, a war activity.

## ILLINOIS OFFICERS

B. H. SCHULL, vice president, Pyramid Coal Corp. was elected president of the Illinois Mining Institute at its 51st annual meeting. He succeeds C. T. HAYDEN, vice president, Sahara Coal Co. Other officers and board members were chosen as follows:

Vice president — GEORGE F. CAMPBELL, Old Ben Coal Corp.

Secretary-treasurer—B. E. SCHONTHAL, B. E. Schonthal & Co., Chicago.

New executive-board members—H. A. REID, United Electric Coal Cos.; PAUL HALBERSLEBEN, Sahara Coal Co.; L. F. LUMAGHI JR., Lumaghi Coal Co.; and HARRY M. MOSES, H. C. Frick Coke Co.

"Although the coal inspection department has no authority to enforce its recommendations, compliance is good," said Mr. Harrington, "and, although operators have not always agreed with the suggestions, production has increased, the accident rate has declined in coal mines while other industrial accidents have been upped 15 or 20 percent. Operators are now sold on the service of the department."

Although it is provided that the U. S. Bureau of Mines may issue regulations "with the force of law" concerning the handling of explosives to prevent theft and sabotage, cooperation was considered better than military oversight. The results, Mr. Harrington declared, "are excellent. There has been no sabotage." There are 4,500 official agents, 350,000 licenses have been issued and 15,000 stores inspected.

As to mine inspection, Mr. Harrington expressed a preference for the present set-up. A bill granting power to enforce recommendations might be offered, he commented, but if passed it would be over his protest. Federal inspection does not conflict with that of the states, and the states should have the job of enforcement.

Proven results of new methods and their stability was the subject of a combined paper and moving picture describing the gathering and transportation of coal in the Kings mine of Princeton Mining Co., Princeton, Ind., by D. W. Jones, superintendent of the mine, and E. H. Johnson, manager, of loading machine division, Jeffrey Mfg. Co., Columbus, Ohio. The theme was the proven advantages of large cars over small cars at the loading machine and the changes necessary to put large cars into gathering service.

The set-up, prior to the change, was cable-reel gathering and trolley-locomotive haulage with 3½-ton cars from working face to shaft bottom. Each loading machine was served with two gathering locomotives delivering to relay locomotives. The 120 cars per loading machine shift consumed 240 minutes loading time and produced 432 tons. This left 180 minutes idle time for the loading machine per shift.

To recover some of this idle time and make better use of the loading machines, it was decided to reduce the number of car changes by using 10-ton cars for gathering. This resulted in a 45-percent increase in available loading time and boosted tonnage 50 percent to 648 tons per loader shift. This required an added locomotive per loading machine, each locomotive hauling 24 cars with nine tons of coal per car.

Each gathering locomotive is permanently coupled to its one car which it hauls directly to a centrally located transfer station where the coal is dumped on a transfer conveyor. Here, main line trains of 30 3½-ton cars are loaded by the transfer

**D. W. Jones, Princeton Mining Co.—new haulage methods and their results.**

conveyors. The transfer station is so located that the working faces are in the range of one-fourth to one-half mile away.

Of the 150 3½-ton cars originally required for a territory, 90 now are used to make up three 30-car main-line trains. The remaining 60 are available as mobile storage if needed. Train movements are such that one train is loading and another is in transit while the third is being hoisted.

The same traffic arrangement governs the movement of the big cars from each loading machine. The travel distance should be limited so that an empty is at hand when a load leaves the loading machine. These big cars are automatic drop-bottom units with six doors to clear the coal in a shallow conveyor bin.

Experience with big cars has revealed many advantages. Compared to small cars the capacity is 2½ to 1, with the ratio in favor of safety better than that. Derailment is but a 40 percent chance and they handle better than small cars. Speed is not affected by size.

To make the fullest use of the new system, a panel is laid out in two sections, inner and outer. Each section consists of a pair of entries, with rooms on 40-ft. centers turned off at an angle of 45 deg. Provision is made for a minimum of eleven rooms of a panel available for working at all times. The inner section is worked first to make the recovery of track material safer. That recovery is made systematically, day by day. Nothing is left to be pulled out in a rush or after a squeeze starts. The recovery of track material is considered as essential to economic operation as recovery of mobile equipment.

One of the advantages of 45-deg. rooms is reducing the use of curved rails to a minimum. It has been found that the cost of laying straight track is about half the cost of laying curved track.

While 17,000 ft. of track are necessary to work out a panel, only 5,000 ft. is assigned to it. The process of continuous recovery of the material permits a 2½ to 3½ time re-use during the life of the panel. Steel ties are used. They hold the rails rigidly to gage and prevent them from turning over.

Big cars for gathering and a transfer station were chosen in this instance because of limiting conditions on the haulage entries and because the old cars did not have to be scrapped. Where haulage entries are large enough, and where other conditions are favorable, the operation of big cars from loading machine to the shaft bottom would be the economical thing.

The loading machine conveyor had to be extended to fill the big cars which have a length of 16 ft. 4½ in. over the bumpers.

The transfer station is built in two parts: (1) the section under the track onto which the coal is dumped from the big cars, with the conveyors traveling 30 ft. a minute; (2) double cross conveyors taking coal from the first and delivering through a crosscut to the train in the adjoining entry. The cross conveyors run 100 ft. a minute to deliver a thin layer of coal.

Jeffrey standard room-conveyor sections are used in sufficient number to make up the necessary lengths, and both conveyors are in pairs to give capacity. The twin conveyor idea provides a 50-percent capacity in case of failure of any one.

The transfer station has one advantage over the loading machine when loading small cars. At the Kings mine, machine-loaded **3½-ton cars netted 6,800 lb., while transfer station loads run 7,600 lb., almost a 12 percent increase in pay load.**

**Dan Harrington, U. S. Bureau of Mines—wartime activities, health and safety.**

Discussion suggested that rail haulage will continue to be used where grades and entry space permit. Where transfer stations are used standard short conveyor sections keep down first cost and removal expense. A transfer station is not a storage bin and should not be so used.

The afternoon session opened with an educational film shown by Dr. M. M. Leighton, Illinois Geological Survey. This presented the work of three departments of the Survey.

Development of stripping shovels up to the 35-yd. monsters of 1941 was outlined by L. H. Sherwood, superintendent, Little John Coal Co., Victoria, Ill. By 1908, said Mr. Sherwood, coal stripping was conducted near Pittsburg, Kan., Danville, Ill., in the Broken Arrow District of Oklahoma; and near Lilly, Ky. Results from early efforts called for a more suitable shovel that could handle big yardage and spoil deep overburden.

The Browning full revolving shovel, put to work near Patricksburg, Ind., in 1909, was followed by a 2½-yd. Vulcan 160-ton full-revolving shovel in Kansas. Illinois got its first big stripping shovel, a Marion 3½-yard machine in 1911. W. C. Hartshorn and, later, R. H. Sherwood, were interested. These and other early pioneers blazed the way for the development of the huge 30- to 35-yd. shovels that strip overburdens of increasing depth and difficulty.

"Comments on the Formation of Committee to Conserve Manpower in the Coal Mining Industry by Preventing Accidents," a paper by Thomas Moses, read in his absence by B. E. Schonthal, institute secretary, outlived the needs and plans for the coal section which has a $30,000 appropriation from the National Safety Council. Mr. Moses is chairman of the coal section.

The plan proposes safety posters suitable for mine display and the cooperation of the union, all operators and mine inspectors in the country for maximum results. The National Safety Council proposes to try to improve on the type of posters used in the past, which, Mr. Moses said, have not been too appropriate for the coal industry.

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## Hydrogenation Bill Passed by Senate

The first legislative step toward hydrogenation of coal was completed when the Senate, on Nov. 9, unanimously passed a bill by Senator O'Mahoney, of Wyoming, authorizing the expenditure of $30,000,000 for construction of plants to develop the manufacture of gasoline and other liquid fuels from coal and shale oil. The bill now goes to the House.

The legislation is designed to help industry develop synthetic gasoline on a commercial basis. It contains safeguards to prevent the government from entering the liquid fuel business following development of a new product.

Senate action came after Secretary of the Interior Ickes had warned that the country could no longer afford to delay starting construction of experimental plants. Ickes first announced he would seek funds for this purpose from Congress in "Coal's New Horizons" (*Coal Age*, April, 1943).

Debate in the Senate developed the fact that industry was unanimous in having government do the groundwork on hydrogenation. All commercial sales, however, would be made through private sources.

Senator O'Mahoney, noting that this country has 51.9 percent of the world's coal reserves, said there is sufficient coal available "to make annually for 1,000 years all of the liquid fuel we now are consuming and still have enough left over to provide for all other purposes." The bill authorizes the Federal Bureau of Mines to build one or more demonstration plants, and O'Mahoney said the product under mass production could be made to sell at 16c. a gallon.

## McCormack Returns

Frank E. McCormack Construction Co., Wilkes-Barre, Pa., announced Nov. 12 that its president, Lt. Frank E. McCormack, has been given a leave of absence from the army to oversee anthracite production at the Gaylord banks, Plymouth, Pa. The company also will start production soon from banks in Luzerne and Lackawanna Counties and a stripping operation at Carbondale, Pa. It requests the opportunity of being placed on the invitation list of companies contemplating strip operations or bank disposals.

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## Acquire Colo. Mine

Thomas and Frank H. Hall of Trinidad, Colo., have acquired control of the operations previously conducted by the Vickers Mining Co. at Kenneth Mine, Rugby, Colo., it was announced Nov. 8.

Operations have begun under the name of Hall Brothers Co. They succeed Kenneth O. Wood as operators of the mine, one of the largest producers in the area. The mine equipment was purchased and the property leased, the announcement said. The Vickers company ceased operation of the mine Oct. 22. Thomas Hall will be superintendent of the operation and Alex Shields will continue as foreman.

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## Lion Coal Expands

By spending $300,000 on improvement and modernization of its plant, the Lion Coal Co., Ogden, Utah, hopes to be able to double its 150,000-ton-a-year output, according to an announcement last month by Manager A. B. Foulger. The properties are located at Wattis, Carbon County, Utah. About half the amount is slated for new equipment, with $70,000 scheduled to be spent on a culinary water supply and sewage facilities. Construction of 150 cinder-block houses for new employees is contemplated. The company will operate two seven-hour shifts after Jan 1, 1944.

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## Obituary

CALEB SAMUEL KENNEY, 55, vice president in charge of sales, Weston Dodson & Co., Inc., Bethlehem, Pa., as well as the Locust Coal Co., Shenandoah, Pa., died suddenly Oct. 31 in the Drake Hotel, New York City. A graduate of Lehigh University, he spent three years with the United States Government in the construction of the Panama Canal, on the completion of which, in 1914, he joined the sales department of Weston Dodson & Co., becoming assistant general sales manager in 1916. In 1921 he became general sales manager, and three years later was made vice president in charge of sales.

GILBERT A. REESE, 58, president, Clinchfield Coal Corp., with mines at Dante, Va., died Oct. 28 in the Murray Hill Hospital, New York City, after a short illness of heart disease. He became president of Clinchfield in 1940, succeeding the late Charles E. Bockus.

F. F. JORGENSEN, labor commissioner of the Northern West Virginia Coal Association, died Nov. 7 at Fairmont, W. Va., after a brief illness. For years he was general manager of the Fairmont Division, Consolidation Coal Co., and after that manager of production for all mines of that company. He also served as manager of operations of the Monongahela Rail & River Coal Co. He was a graduate of the Department of Mining Engineers, Iowa State University.

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## Accident Fatality Rate Shows Slight Change

Accidents at coal mines of the United States caused the deaths of 84 bituminous and 36 anthracite miners in September last, according to reports furnished the U. S. Bureau of Mines by State mine inspectors.

With a production of 51,840,000 net tons, the accident death rate among bituminous miners in September last was 1.62 per million tons, compared with 2.01 in September, 1942.

The anthracite fatality rate from accidents in September last was 6.62 per million tons, based on an output of 5,441,000 tons, against 3.13 in the ninth month of last year.

For the two industries combined, the accident fatality rate in September last was 2.09, compared with 2.12 in the corresponding month a year earlier.

Fatalities during September last, by causes and states, as well as comparable rates for the first nine months of 1942 and 1943, were as follows:

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## A.L.A. Wants Journals

One of the most difficult tasks in library reconstruction after the first World War was to complete foreign institutional sets of American scholarly, scientific and technical periodicals. The attempt to avoid a duplication of that situation is now the concern of the Committee on Aid to Libraries in War Areas, created in 1941 by the American Library Association and headed by John R. Russell, librarian of the University of Rochester.

Many sets of journals will be broken by the financial inability of the institutions to renew subscriptions, through mail difficulties and loss of shipments, while still other sets will have disappeared in the destruction of libraries. As far as possible they will be completed from a stock of periodicals being purchased by the committee. Requests received by the committee already give evidence that the demand will be enormous.

With an imminent paper shortage attempts are being made to collect old periodicals for pulp. Fearing this possible reduction in the already limited supply of scientific and technical journals, the committee hopes to enlist the cooperation of subscribers to this journal in preventing the sacrifice of this type of material to the pulp demand.

Questions concerning the project or the committee's interest in particular periodicals should be directed to Dorothy J. Comins, executive assistant to the Committee on Aid to Libraries in War Areas, Library of Congress Annex, Study 251, Washington 25, D. C.

**UNITED STATES COAL-MINE FATALITIES IN SEPTEMBER, 1943, BY CAUSES AND STATES**

| State | Underground: Falls of Roof | Falls of Face | Haulage | Gas or Dust Explosions | Explosives | Electricity | Machinery | Other Causes | Total Underground | Shaft | Surface | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alabama | .. | .. | .. | .. | 1 | .. | .. | .. | 1 | .. | .. | 1 |
| Colorado | 1 | .. | 2 | 1 | .. | .. | .. | .. | 4 | .. | .. | 4 |
| Illinois | 1 | .. | 2 | .. | .. | 1 | .. | .. | 4 | .. | .. | 4 |
| Kentucky | 8 | 1 | 3 | 12 | .. | .. | 1 | .. | 25 | 1 | .. | 26 |
| Maryland | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | 1 |
| Missouri | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | 1 |
| Ohio | 2 | .. | 2 | .. | .. | .. | 1 | .. | 5 | .. | .. | 5 |
| Penna. (bit.) | 7 | .. | 3 | .. | .. | .. | .. | .. | 10 | .. | 1 | 11 |
| Tennessee | .. | .. | .. | .. | 1 | .. | .. | .. | 1 | .. | .. | 1 |
| Virginia | 2 | .. | 1 | .. | .. | .. | .. | .. | 3 | .. | .. | 3 |
| West Virginia | 15 | 1 | 6 | .. | 1 | .. | 2 | 1 | 26 | .. | .. | 26 |
| Wyoming | .. | .. | 1 | .. | .. | .. | .. | .. | 1 | .. | .. | 1 |
| Total bituminous | 38 | 2 | 20 | 13 | 3 | 1 | 4 | 1 | 82 | 1 | 1 | 84 |
| Pennsylvania (anthracite) | 11 | 1 | 5 | 14 | 1 | 1 | .. | 1 | 34 | .. | 2 | 36 |
| Grand total | 49 | 3 | 25 | 27 | 4 | 2 | 4 | 2 | 116 | 1 | 3 | 120 |

**DEATHS AND FATALITY RATES AT U. S. COAL MINES, BY CAUSES OF ACCIDENTS***

January-September, 1942 and 1943

| Cause | Bituminous: Number Killed | | Killed per Million Tons | | Anthracite: Number Killed | | Killed per Million Tons | | Total: Number Killed | | Killed per Million Tons | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1942 | 1943 | 1942 | 1943 | 1942 | 1943 | 1942 | 1943 | 1942 | 1943 | 1942 | 1943 |
| Underground: | | | | | | | | | | | | |
| Falls of roof and coal | 462 | 460 | 1.071 | 1.044 | 105 | 83 | 2.310 | 1.808 | 567 | 543 | 1.190 | 1.115 |
| Haulage | 180 | 169 | .418 | .383 | 27 | 29 | .594 | .631 | 207 | 198 | .434 | .407 |
| Gas or dust explosions: | | | | | | | | | | | | |
| Local | 8 | 20 | .019 | .045 | 6 | 1 | .132 | .022 | 14 | 21 | .029 | .043 |
| Major | 121 | 135 | .281 | .306 | .. | 14 | .... | .305 | 121 | 149 | .254 | .306 |
| Explosives | 14 | 22 | .032 | .050 | 10 | 7 | .220 | .152 | 24 | 29 | .050 | .060 |
| Electricity | 42 | 25 | .097 | .057 | 5 | 1 | .110 | .022 | 47 | 26 | .099 | .053 |
| Machinery | 33 | 19 | .077 | .043 | 1 | 1 | .022 | .022 | 34 | 20 | .071 | .041 |
| Shaft | 4 | 7 | .009 | .016 | 2 | 1 | .044 | .022 | 6 | 8 | .013 | .016 |
| Miscellaneous | 28 | 23 | .065 | .052 | 9 | 10 | .198 | .218 | 37 | 33 | .078 | .068 |
| Stripping or open-cut | 18 | 17 | .042 | .039 | 2 | 7 | .044 | .153 | 20 | 24 | .042 | .049 |
| Surface | 40 | 46 | .093 | .104 | 10 | 17 | .220 | .370 | 50 | 63 | .105 | .129 |
| Grand total | 950 | 943 | 2.204 | 2.138 | 177 | 171 | 3.894 | 3.725 | 1.127 | 1.114 | 2.365 | 2.288 |

* All figures subject to revision.

## Advisory Board Named By Rescue Service

To obtain advice on technical problems arising in the development of the Rescue Service and to establish cooperative relationships with interested groups, the Medical Division of the Office of Civilian Defense has recently appointed the Rescue Service Advisory Board.

Dr. Royd R. Sayers, Director, U. S. Bureau of Mines, is chairman of the new board. The members are:

Edward Steidle, dean, College of Mineral Industries, Pennsylvania State College, State College, Pa.

George H. Deike, chairman, board of directors, Mine Safety Appliances Co., Pittsburgh, Pa.

William P. Yant, director of research, Mine Safety Appliances Co.

David J. Price, Ph.D., principal chemical engineer, Bureau of Agricultural and Industrial Chemistry, U. S. Department of Agriculture, Washington, D. C.

H. H. Foreman, managing director, Associated General Contractors of America, Washington, D. C.

R. E. Donovan, chief safety engineer, Standard Oil Co. of California, San Francisco.

Dan Harrington, chief, Health and Safety Section, U. S. Bureau of Mines, Washington, D. C.

Major-General U. S. Grant 3d, chief, Protection Branch, Office of Civilian Defense.

George Baehr, Chief Medical Officer, Office of Civilian Defense.

Simon H. Ash, chief, Rescue Section, Medical Division, Office of Civilian Defense.

Claude S. Young, Allentown, Pa., civil and mining engineer with many years' experience in mines and construction projects in the United States and Mexico, has been appointed regional rescue officer for the Third, Fourth and Eighth Civilian Defense Regions, with headquarters in Baltimore. He has been commissioned in the U. S. Public Health Service and detailed to the Medical Division, Office of Civilian Defense.

James Westfield, coal-mine inspector and engineer in charge of the McAlester (Okla.) station of the U. S. Bureau of Mines, has been appointed rescue officer of the Ninth Civilian Defense Region, with headquarters in San Francisco. He has been commissioned in the U. S. Public Health Service and assigned to the Medical Division, Office of Civilian Defense.

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## 24 Companies Named In Pollution Suit

The City of Philadelphia, on Oct. 29, filed suits in Common Pleas court to restrain 24 coal companies from dumping anthracite silt into the Schuylkill River, which the city says is seriously impairing the water supply.

The suits were filed by City Solicitor Robert McCay after the Pennsylvania Supreme Court refused to reopen suits which were instituted 36 years ago and subsequently dropped when the companies promised to halt the practice.

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## Association Activities

HARLAN COUNTY COAL OPERATORS' ASSOCIATION, Harlan, Ky., re-elected C. S. Guthrie, general superintendent, Harlan Fuel Co., Yancey, Ky., president for the next term at the annual meeting Nov. 17. R. E. Lawson, general manager, Cornett-Lewis Coal Co., Harlan, was re-elected vice-president, and George S. Ward was again chosen secretary. Speakers on the meeting program included E. R. Kaiser, Bituminous Coal Research, Inc.; Roy Carson, traffic manager, National Coal Association; W. J. Cunningham, Crummies Creek Coal Co.; and Capt. Ted McDowell, Fort Knox, Ky.

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## See Boom in Coal On Tennessee River

Movement of coal by barge on the Tennessee River and the economies both in handling and freight tariffs made possible by this means of transportation are attracting attention not confined to shippers whose production and markets are limited to this immediate area, reports from the area indicate. Construction of nine hydroelectric dams on the main course of the river, each equipped with adequate locks for commercial navigation, has been followed by dredging of a minimum 9-ft. channel that opens this water route from Paducah, Ky., where the Tennessee flows into the Ohio River, 652 miles upstream to the mining and industrial regions in the eastern mountains of Tennessee.

Movement of bulk freight, such as coal, grain, gasoline and timber products, following closely on the heels of dredging operations and the construction of five new river terminals, one for coal and four for general cargo, establishes the Tennessee as an important tributary of the inland waterway system stretching from Minneapolis and the Great Lakes to the Gulf.

Estimates based on the statements of the ability of 3,700 potential shippers in 191 communities to transport their products and receive supplies by river indicate that by 1945 the annual freight movement on the Tennessee will more than double present tonnage, meaning some 2,647,000 tons with an average saving in freight tariffs, it is reported, of $1.30 a ton, or about $3,500,000. Coal movement for 1945 is set at about 573,612 tons. Coal movement stands second only to sand and gravel in both volume and relative value, with gasoline third.

The four public-service terminals, of which three have been completed, were financed by the Tennessee Valley Authority at an over-all cost of $600,000. The first of these to be completed, at Chattanooga, was dedicated Aug. 27. Terminals at Decatur and Guntersville, Ala., were opened formally to traffic on Sept. 24 and 25. The terminal at Knoxville will be in operation by the first of the year. These warehouses are designed primarily to service package freight down the Mississippi and Ohio rivers and up the Tennessee for transshipment at these ports.

The coal terminal at Harriman, in the bituminous mining region between Chattanooga and Knoxville, providing facilities for handling coal direct from railroad cars and trucks to barges by a hopper and belt conveyor, was built at a cost of $110,000. It has a maximum annual capacity of 750,000 tons. It is leased for present operation to the Tennessee Valley Sand & Gravel Co., Sheffield, Ala.

"Why don't you get your brakes fixed?"

# Combustion Engineers Scan Coal's Future

***Coal After the War—What Research Can Do—Testing Domestic Coals—Personnel Training for Efficiency and Safety — Gas-Producer Operation — Forecasting Pressures in Coking — Stabilizing Coal-Oil Fuels***

TRENDS IN FUELS, now and after the war, were highlighted in a panel discussion at the close of four sessions devoted to combustion, coal research and training for mining men featuring 7th Annual Joint Fuels Conference of the Coal Division, American Institute of Mining and Metallurgical Engineers, and the Fuels Division, American Society of Mechanical Engineers, Oct. 28 and 29, Pittsburgh, Pa. This symposium was introduced by J. E. Tobey, managing director, Upper Monongahela Valley Coal Bureau, New York.

*After the War, Oil or Coal?*—Oil will be used in places in which it is abundant and wherever coal shortages are experienced, but the oil companies will continue their efforts to convert as much oil as possible into gasoline, declared O. F. Campbell, Sinclair Refining Co., East Chicago, Ind. It will be a patriotic gesture by all consumers to provide such equipment as can be promptly converted to such liquid or solid fuels as at any time may be available. That practice has been followed at oil plants which have used without prejudice coal, oil, petroleum, coke or natural gas as opportunity and economy suggested. Oil has been burned above coal in the West to increase the steam production of the latter and to overcome a limited coal capacity.

### Outlook for Oil

It is likely that domestic furnaces will use a heavy black oil instead of the fuel now supplied for that purpose. Mr. Campbell's inquiries had developed that after the War there would be on hand many second-hand coal stokers owned by firms that had converted to coal and who desire to return to oil when it once more becomes available, because oil combustion demands less labor than the burning of coal. Mr. Campbell did not think there would be any less fuel oil after the War than now. Not all of it will be made into high octane gasoline. Conversion from coal to oil and vice versa has been found easy wherever dual-purpose furnaces are provided, asserted William G. Christy, smoke abatement engineer, Hudson County, Jersey City, N. J.

Certain districts already prohibit use of natural gas for industrial-boiler fuel, declared A. W. Thorson, Solid Fuels Administration for War, Washington, D. C. In a few years there will be no more natural gas available for use as boiler fuel; coal and oil will have to fill the vacuum, and it is probable that the Fisher-Tropsch process will convert into gasoline what little natural gas remains. The diesel engine has proved so efficient and so applicable to railroad locomotives that it has cut into the market for railroad coal.

Boiler furnaces should be designed to burn any combination of fuels that may be available whether pulverized coal, natural gas or oil, urged Henry Kreisinger, engineer-in-charge, research and development, Combustion Engineering Co., New York. Steel plants or gas plants may have to burn coke breeze, blast-furnace gas, coal tar or fuel oil. Many furnaces for these combinations of fuels are in successful operation. Fuel oil can be burned in a powdered-coal furnace and will give a greater rate of heat liberation than pulverized coal. Locomotive boilers will be of tubular design utilizing pressures from 800 to 1,200 lb. per square inch. Pulverized coal will be used. Before that, briquetted coal may be used in locomotive boilers, but only as an intermediate provision.

After the War, it is possible that we shall have more government control of critical materials than heretofore, and conservation will be the order of the day, prophesied J. F. Barkley, chief, Division of Solid Fuels Utilization for War, Washington, D. C. In time, it may be that we shall burn neither oil nor gas for the raising of steam. At present, in general, the better the plant, the more the boiler unit is a primadonna, over-sensitive to the kind of coal it will burn. The spreader stoker, for example, has the virtue that it will adapt itself well to a wide range of fuels.

*More Automaticity Demanded*—Too often is coal burned domestically, declared H. J. Rose, Anthracite Industries, Inc., without the benefit of automatic devices which are adaptable to hand-fired as well as to mechanically-fired equipment. Price and availability are, and will be, the great uncertain factors in regard to oil.

Anthracite Industries now employs 50 men in research and there would be more if the right ones were available, no restriction being imposed by the anthracite operators on money for research. In rating domestic furnaces, it is the established principle not to rate by what they will do when newly started and expertly handled, but by how they will perform in the hands of the public. From the day the fire is lighted in the furnace, its effectiveness declines.

*Must Prepare for Decline in Coal Values*—Year by year the premium fuels that have wide applicability and give minimum trouble in burning are being exhausted, stated E. C. Payne, consulting engineer, Consolidation Coal Co., New York, and coals that are more difficult to burn will have to carry the load. The average fusibility of steam coals being burned today probably is around 2,300 deg. F., declared Mr. Tobey in conclusion, and every year the average will get lower. Equipment that will not burn these coals should not be installed, for the owner will find himself in a tight spot.

*Coal Must Not Coast to Chaos*—The coal industry has for years been giving ground to water, oil and natural gas, and it will continue to coast down the road to chaos if it does not awaken and do something about it, asserted Mr. Tobey, introducing the Research session. "Equipment" is the magic word that like "sesame" will open the door of opportunity to the coal industry. With better equipment the future of coal is assured. It is not a defective fuel, for which excuses need be made.

### Choosing Coal

*Six Factors in Coal Choice*—No evaluation of coal for domestic stoker use will suit everyone, declared R. J. Helfinstine, mechanical engineer, State Geological Survey, Urbana, Ill., because users lay different emphasis on certain qualities, and some of the desired characteristics cannot be evaluated objectively and others only to a limited extent. Those being measured more or less objectively in the Illinois State Geological Survey are (1) heat obtained per pound, (2) uniformity of heat release, (3) responsiveness of fire, (4) ability to hold fire, (5) smoke density, (6) convenience of operation.

*Stoker vs. Coal Performance*—In rating stoker coals, said C. H. Sawyer, research engineer, Koppers Co., Kearny, N. J., a week of tests at different operating cycles are taken. The ease with which clinker is formed is just as important as the quantity of ash present, and the type of stoker modifies markedly the performance of a coal. In this, Dr. T. S. Spicer, assistant professor, Pennsylvania State College, State College, Pa., concurred, saying stokers should be tested for coal, not coal for stokers, for the coal cannot be changed but the stoker can be redesigned to suit the coal.

Until the fundamental principles of coal combustion are better understood, declared L. A. Shipman, combustion engineer, Southern Coal & Coke Co., Knoxville, Tenn., the more will be the apparent differences in the findings of the several investigators, and the greater will be the confusion. The differences though seemingly contradictory are so only because of the differences in the equipment used, in its operation and in the coals tested, because these factors fundamentally modify the conditions surrounding combustion.

## EQUIPMENT APPROVALS

Two approvals of permissible equipment were issued by the Bureau of Mines during October as follows:

Joy Mfg. Co.—Type 12BU-7 loading machine; five 3-hp. motors, 220-440 volts a.c. Approvals 489 and 489A, October 18.

Joy Mfg. Co.—Type 11 BU-7G/H loading machine; 50-hp. motor, 220-440 volts a.c. Approvals 490 and 490A, October 21.

HERE'S a picture of a track joint which isn't! A Thermit weld has formed the two rail sections into one continuous piece.

The use of Thermit welding for joining rails on main haulage track effects three principal savings: (1) reduced track maintenance, as there are no angle bars, bolts, bonds, no battered rails to repair or replace; (2) lower power consumption, as there can be no leakage of current which occurs in a mechanical joint; (3) increased life of the rail and of rolling stock, as there is no wear or jarring at a joint which isn't there!

**THERMIT WELDS FOR REPAIR OF HEAVY PARTS**

The breakdown of heavy mechanical equipment can be a serious problem in these days when rapid replacement is almost impossible. Thermit welding is ideally adapted for the repair of heavy parts of stripping shovels, shaker drives, crushers, loading machines, and other equipment used in mine operation.

A Thermit weld is as strong as the casting or forging itself, and the time required for the work is usually a matter of days, rather than the months required for replacement.

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**VICTORY NOTE**—Tremendous demands for aluminum for war production have caused a temporary shortage of Thermit for rail welding. You will want to keep this ideal rail joint in mind for the future, if you cannot get Thermit today. ★ ★

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When stoker coals are rated on the basis of their performance in a single stoker, the results probably will be misleading, stated Dr. C. C. Wright, supervisor of coal research, Pennsylvania State College, because only the performance of the coals in that particular stoker is thus tested. That the performance would be quite different in another stoker was illustrated by a motion picture of combustion of a heavily coking coal in a modified stoker in which ideal performance was obtained.

*A Job For Coal Itself*—For years, asserted Elmer R. Kaiser, assistant to president, Bituminous Coal Research, Inc., Columbus, Ohio, the coal-mining industry has been interested almost exclusively in production and has left research and engineering in coal utilization to others. Advances made by competing and higher cost fuels in winning customers from coal through more desirable combustion equipment, however, have stimulated the coal industry to reverse this trend.

Producers of over 35 percent of the nation's bituminous-coal output, six coal-carrying railroads and 27 stove manufacturers now support the research program, and the rate of expenditure is currently $86,000 a year. Perfection of coal-burning equipment—both hand-fired and fully automatic mechanically-fired heating equipment—is the key to an increase in the percentage of houses and apartments that will be heated by coal.

**For Equipment Satisfaction**

To insure stoves, stokers and furnaces that will keep the public "sold" on using coal, performance and rating codes and methods of testing also should be devised. Manufacturers will be informed as to the weaknesses in their products, and satisfactory equipment will be given B.C.R. approval, which also will provide designs of suitable chimneys for use with coal burners.

*Industrial Steam Uses*—Steaming rates of boilers have been increased until with these rates only a few premium coals give satisfaction. Studies are proposed which will determine how to improve and regulate stokers of various types so that it will be less necessary to be critical of coal and ash characteristics and so that operation will be freed of smoke, fly ash, and uncontrolled slagging. Methods of obtaining higher heat liberation rates per cubic foot of combustion space, better control of combustion products until their heat can be extracted and freedom from slagging and clogging of boiler passes, would improve greatly coal's competitive position. Excessive furnace temperatures, which fuse ash needlessly, can be controlled by returning to the furnace part of the flue gases—not a new principle this, but one needing further study.

Study of firing pulverized coal in alloy-steel tubes, which in turn transmit heat to the furnaces, also has been under way. Application of pulverized coal to radiant-tube furnaces should be developed so that coal may be used for heating materials that cannot be allowed to come in contact with combustion products.

Furnaces that could use coal are not so used partly because the availability of newly developed combustion controls has not been fully recognized. Pulverized coal and producer gas from coal should be adapted

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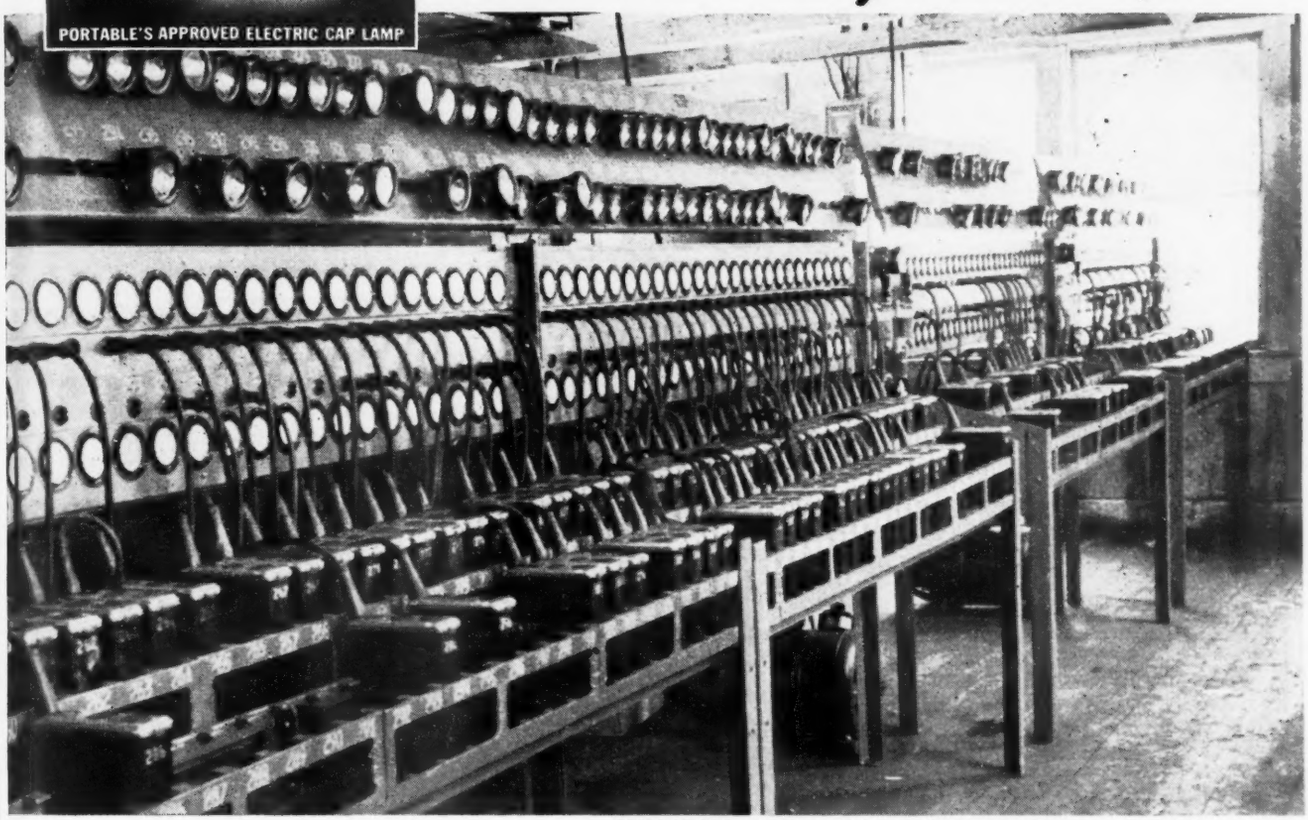

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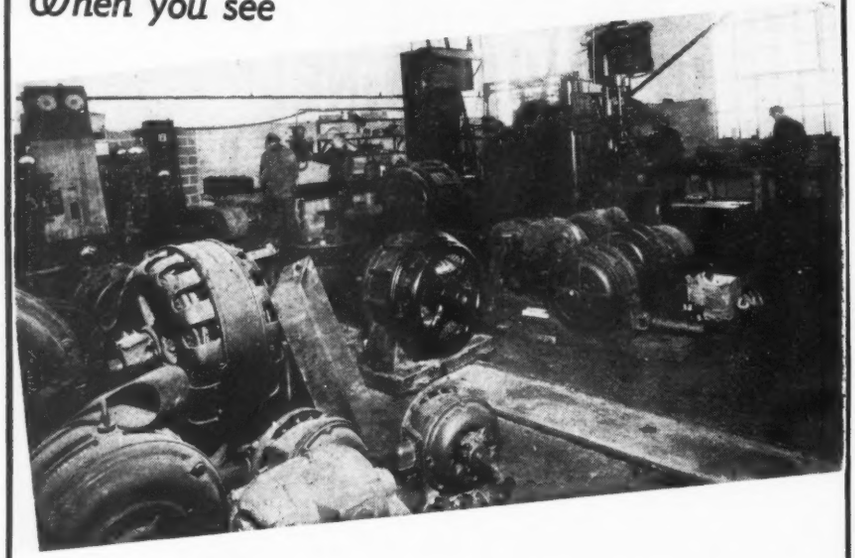

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Sleeve bearings don't cause *all* motor trouble—but they are accountable for too big a percentage of it.

Sleeve bearings wear and cause interference of rotor and stator on AC motors. Oil, used to lubricate sleeve bearings is carried as a vapor in the ventilating air stream—causing coil failures or commutator burnouts.

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Our laboratory rigidly controls every ingredient going into *Superior* brushes and every manufacturing step. Each successive process must be approved by frequent sampling before the next step is taken. *Superior* engineers then follow into the field, study brush performance under actual operating conditions, and get the user's angle. All this makes for uniform quality.

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to such furnaces. Internal-combustion engines and gas turbines, when developed for the direct combustion of pulverized coal under pressure, will become potential coal users, but the organizers of the program have no illusions about the difficulties of this task.

Finely crushed coal is used in foundry sand, and preliminary tests have shown promise for it as a filler in synthetic rubber. Carbon black may be made from coal. Pulverized coal may serve as an ingredient in refractory manufacture, and agriculture may find many uses for coal.

*Preparation Problems*—Data are required on the performance of dewatering screens as related to design and conditions of coal preparation. Better methods should be used to dry coal, and we still do not know how best to freezeproof carloads of coal. Likewise, the round-hole equivalents of the various shapes and sizes of screen openings used in coal preparation should be determined as a useful basis for selecting screens and for use in case of future regulation. Redesign of picking tables, possible introduction of mechanical and electronic aids in separating coal from impurities, cleaning of fine sizes of coal by new principles and recovery of pyrite are needed investigations.

### Coking Determines Performance

Performance of coal on underfeed stokers is largely determined by its coking characteristics. Hence, a suitable laboratory test for coking property or plasticity should be perfected to facilitate selection of coals for that purpose. Though an accurate measure of ignition temperature has been developed, more information is needed to relate this measurement to ignition in commercial furnaces.

Ash behavior is the most critical factor remaining in the field of steam generation, according to Mr. Tobey. Though softening temperature has been found inadequate as a criterion for the clinkering and slagging of coal ash, new criterions have not been developed to aid in coal selection. Studies of low-cost methods of collecting fly ash also should be initiated. Development of uses for coal ash and burned gob-pile refuse frequently has been attempted, but no comprehensive study has been reported to the industry. Use of ash as a fireproofing and insulating material and as an ingredient in ceramic products has been suggested.

*Carbonization*—At least one-sixth of the total coal production is carbonized. New methods are needed if coals for carbonization are to be selected successfully. Simple test methods are needed for the study of possible blends. To obtain the best coke structures and characteristics, a clearer understanding of the behavior of coals on coking is needed. We have yet to learn what qualities in coke determine its behavior in cupolas and blast furnaces. The higher sulphur content of the remaining reserves of coking coal requires both a re-evaluation of the importance of sulphur, which may have been overestimated, as well as the development of better methods of removing sulphur from coking coals and from coke.

*Gasification*—To increase the quantity of coal used by utilities and others in gas manufacture, B.C.R. is sponsoring the development of a radically new process for

# SWING IT for VICTORY

The output of any shovel depends on the operator's "know how." Check your shovel performance with the list below and perhaps you'll find a point or two that will help. We all want to win this war the quick way . . . let's go!

1. Keep the swing short . . . spot trucks in close.
2. Cut a thin slice up along face so the dipper comes up fast and easy. Don't overcrowd!
3. Keep dipper teeth sharp.
4. Set pitch braces for fast digging. Angle of teeth should usually match average angle of bank.
5. Keep your friction clutches right. You can't dig fast with a sloppy clutch adjustment.
6. Loosen the bank while you wait for trucks.
7. Overlap your cycle . . . have dipper at right height for dumping when it swings over truck; swing and lower; come in crowding.
8. Move up often, work your bank close.
9. Steady does it — keep 'em swinging.

# Bucyrus-Erie

SOUTH MILWAUKEE, WISCONSIN, U. S. A.

completely converting the hydrocarbons in pulverized bituminous coal into gas by a simple, low-cost process that will make gas without byproducts from the widest range of coking and noncoking coals. Meantime, existing types of gas producers which make gas of high luminosity should be improved. Underground gasification of coal, a development that has gained attention in Russia and is being given serious consideration in England, has not received adequate attention in this country.

*Railroad Fuel*—Diesel power seriously threatens coal in the railroad industry which uses a fifth of the coal production. Recent discussions between a technical committee of B.C.R. and of the railroad industry have indicated that the advantages claimed for diesel locomotives can be obtained with coal-fired locomotives. New designs of coal-burning steam locomotives, with increased economy through the use of water-tube boilers, higher steam pressures, more complete combustion, and smoother operation through new driving mechanisms are indicated. Another possibility is the development of a pulverized-coal-fired turbine for locomotives. Smoke from existing locomotives can be greatly reduced by installation of over-fire air jets of a Battelle design.

*Chemicals from Coal*—This investigation includes coal hydrogenation, but its main objective is not the production of motor fuel but rather that of an ash-free liquid which then could be processed to yield a variety of products, such as tar acids for plastics and solvents. This processing would require extensive investigation.

The Bureau of Mines has found hydrogenation yields ten times as much tar acid as carbonization of the same coal. Further work may disclose that this factor may be increased to 20 or 30. Even if it were only ten, and the tar acids were recovered and sold at current prices with the residue sold for motor fuel, the net cost of gasoline might be reduced about 5c. a gallon. Need for tar acids will increase, for the plastics industry in 1941 used 86 percent of the production, doubling its production between 1939 and 1941, which in the latter year, was 430,000,000 lb. If the cost of production of ashless coal can be made low many uses may be found for it.

*Financial Support for Research*—A fourth of a cent per ton for the next five years has been asked of bituminous producers. Unless producers of 150,000,000 tons annually agree to make this subsidy, declared Howard N. Eavenson, president, B.C.R., Pittsburgh, Pa., none of the research will be undertaken. Thus far, producers of 83 to 85 millions of tons have agreed to participate.

### Furnace Best Bet

*Most Vital Research First*—Frankly, the research corporation is seeking the most remunerative and simplest solutions. At present, it is not doing long-range investigations. Apparently, the design of a domestic furnace that will meet the public approval seems "the best bet." An effort is being made to satisfy the usual smoke law requirement which demands only smokeless burning. St. Louis wants smokeless coal, which is a coal that, no matter how burned, will not smoke. The railroad locomotive seems a good second objective. Complete gasification appears to be a third, with the coking of high-sulphur coals a fourth objective. Once no coal with more than 1 percent sulphur was acceptable to the furnaceman, now he only demands 1.35 percent, though he sometimes has to take 1.50. The administrative staff of B.C.R. will have to be enlarged and a director of research appointed.

*Sales Work Needed*—Research and development must go hand in hand, declared Dr. H. H. Lowry, director, coal research laboratory, Carnegie Institute of Technology. Research has to be sold to the public and also to the chemists. If they see in it only a dead-end with no future, it will be difficult to obtain them. It is not easy to find men with the necessary qualifications unless the coal companies will find places for those who have proved themselves qualified to undertake company research.

Pennsylvania State College began its coal researches in 1932 and they have continued for eleven years. The results must have appeared of value to the sponsors, asserted Dr. A. W. Gauger, director, mineral industries research. Research is not a lane that leads nowhere, said Dr. Frank H. Reed, chief chemist, Illinois State Geological Survey, Urbana, Ill. We used to burn 6 lb. of coal per kilowatt-hour and today 1 lb. will do the work.

*What Personnel Failures Most Need Correction*—Factors or reasons that commonly motivate management to inaugurate a training program, asserted G. Ralph


# MONEY
## *in the "bank"?*

**In these days of coal shortages, the picking belt rejects and tailing pond material accumulating in your culm banks may well represent good, hard cash in another kind of bank.**

**For in PLAT-O Coal Washing Tables, many operators have found an easy, profitable way to salvage these fine sizes of coal. PLAT-O Tables will reclaim coal as small as 1/8" x 0 at the rate of 15 or more tons per hour. Moreover, this operation is easy on the manpower because separation takes place in full view of the operator . . . permitting one man to handle up to 20 or more tables.**

**Why not dig into those waste piles now and convert them into profits and a source of power which your country urgently needs today? Why not write us for full particulars?**

**EXAMPLE**

**One operator's record showed the following: Three PLAT-O tables handled over 33 tons of sludge per hour . . . recovered an average 60% as saleable coal . . . 147 tons per 7-hour day . . . at an estimated cost of .06 per ton for handling. Value of recovered coal, $1.65 per ton.**

# The women

They know that this is war, and that the price of victory will be high. They have sent off their sons, brothers and husbands to the armed forces, and they are coming out of beauty shops and offices, stores and hômes, and are taking war jobs in steel mills and shipyards. The deft hands that in peacetime wielded the skillet and the dryer are now managing the boring mill and the welding torch—and to very good effect.

Ever try keeping traffic flowing smoothly in and out of the main entrance of a big steel plant? Ever knock a "hot top" off an ingot? Or rough-bore a gun forging? Or weld a ship's hull? Not women's work? Women are every day doing these and dozens of other jobs in Bethlehem shipyards and steel plants, and doing them superbly.

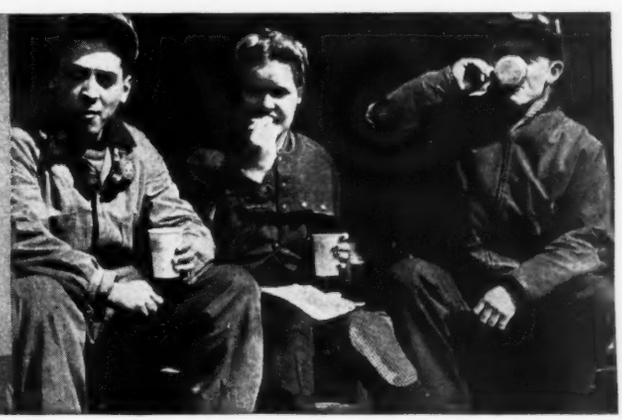
At Bethlehem and Lackawanna, at Baltimore, at Fore River and Hingham, on the Pacific Coast—and at other locations where this company operates plants and shipyards—former clerks and beauty-shop operators, salesgirls and housewives, are applying themselves to their new, challenging tasks with wonderful spirit and skill. They are helping to swell the mighty output of steel and ships and ordnance. The results of their efforts are being painfully felt in Tokyo and Berlin. Hats off to them!

★ ★ ★ BETHLEHEM STEEL ★ ★ ★

Woman "patrolman" at a Bethlehem steel plant. Here is a job calling for plenty of tact and skill! Women are serving on patrol duty at gates, parking lots, offices, and other locations with efficiency and aplomb.

Once a dancer, now she runs a machine in a Bethlehem shipyard.

This "buggy" operator is hauling naval shells in a Bethlehem plant.



Upswept hairdo, red finger-nails, don't keep this girl welder from doing a man-size job at a Bethlehem shipyard.

**COMPARISON OF COSTS OF PRODUCER GAS, FUEL OIL AND NATURAL GAS**

| Hot Raw Producer Gas | | | Fuel Oil Equivalent | Natural Gas Equivalent |
|---|---|---|---|---|
| Coal Cost per Delivered Ton 27,000,000 B.t.u. | Cost of Producer Gas Per Ton Coal 19,200,000 B.t.u. | Per Million B.t.u. | Price per Gallon 145,000 B.t.u. | Price per 1,000 cu. ft. or 1,000,000 B.t.u. |
| $2.00 | $3.75 | $0.195 | $0.0253 | $0.195 |
| 2.50 | 4.25 | 0.221 | 0.0291 | 0.221 |
| 3.00 | 4.75 | 0.247 | 0.0328 | 0.247 |
| 3.50 | 5.25 | 0.273 | 0.0366 | 0.273 |
| 4.00 | 5.75 | 0.299 | 0.0404 | 0.299 |
| 4.50 | 6.25 | 0.325 | 0.0442 | 0.325 |
| 5.00 | 6.75 | 0.351 | 0.0480 | 0.351 |
| 5.50 | 7.25 | 0.377 | 0.0517 | 0.377 |
| 6.00 | 7.75 | 0.403 | 0.0555 | 0.403 |
| 6.50 | 8.25 | 0.430 | 0.0594 | 0.430 |
| 7.00 | 8.75 | 0.456 | 0.0632 | 0.456 |

Cost of gasifying coal per net ton is assumed to be $1.75.

Cost of producer gas per million B.t.u. is based upon:

| | Per Lb. Coal |
|---|---|
| 60 cu. ft. of gas @ 60 deg. F. per lb. coal, and 140 B.t.u. per cu. ft. | 8,400 B.t.u. |
| Sensible heat with gas delivered to furnace @ 700 deg. F., 60 cu. ft. of gas @ 11 B.t.u. per cu. ft. | 660 B.t.u. |
| Tar, 60 cu. ft. of gas @ 0.0006 lb. tar per cu. ft. and 15,000 B.t.u. per lb. tar | 540 B.t.u. |
| | 9,600 B.t.u. |

Heat in producer gas at 700 deg. F. per ton coal, 2000x9600, or 19,200,000 B.t.u.

Price of fuel oil allows for charge of $0.003 per gal. for steam, power and depreciation but no charge for depreciation. If depreciation charge on gas producer plant is neglected, deduct $0.0046 per gal. from price of oil shown.

Price of natural gas covers fuel cost only. If depreciation charge on gas producer plant is neglected, deduct $0.032 per M cu. ft. from price of gas shown.

Spindler, assistant director, mining extension department, West Virginia University, Morgantown, W. Va., are some unsatisfactory condition or performance record, changes in methods or equipment requiring new or special skills or a general personnel shortage requiring the employment of untrained or inexperienced persons. It may be a bad safety record, low production, frequent and costly delays, equipment failures and breakage or changes in standard practices. Though the scope of the training should not be narrow, these facts should be ascertained, and the classes designed to eliminate these personal failures and deficiencies.

*Three Programs of Instruction*—The Training-in-Industry program sponsored by the War Manpower Commission is a good example of planned training procedure with a definite and fixed objective. It covers three specific skills: (1) Skill in instruction—Job Instruction Training; (2) skill in getting the cooperation and best efforts of the persons supervised—Job Relations Training; and (3) skill in planning, or the analysis of production operations to detect or devise means of more efficiently using materials, machines, time and manpower—Job Methods Training. Said Mr. Spindler: In this emergency, these programs have been of definite value to the coal industry, but the most lasting benefit may be in the lesson they have given us in training methods.

### Fatality Age Up

*Old Men and Injuries*—Safety instruction is needed by men at the face more than training in production, efficiency and economy, countered Richard Maize, secretary of mines, Commonwealth of Pennsylvania, Harrisburg, Pa. Records show that the average age of men killed in mine accidents is greater than before the war, as is to be expected because of the many mine workers between 21 and 38 inducted into the armed forces. Old men may have more fatalities than young men, possibly only because an injury from which a virile young man will recover will kill an old man, because old men are more careful. What is it we need most, new methods of supervision or more intelligence on the part of the face worker? Job-instruction courses have not reduced or increased production, said Mr. Maize. One mine, declared D. L. McElroy, chief engineer, Consolidation Coal Co., Fairmont W. Va., has, as the possible result of such instruction, raised its production 1 ton per manday.

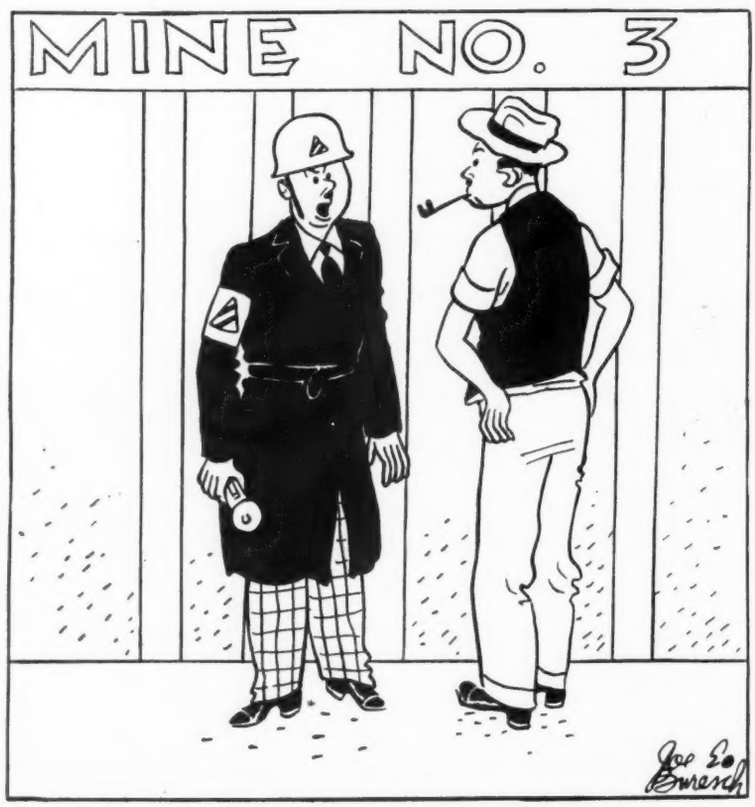
Accidents at the face from falls are due not so much to lack of supervision as to the use of too heavy charges of explosives, said Carl Scholz, consulting engineer, Charleston, W. Va. Permissible explosives break rock as well as coal, and accidents result.

The coal strike has blocked the return to coal, asserted R. M. Weidenhammer, president, Cosgrove Coal Co., Johnstown, Pa. Thus, the greatest opportunity the industry has had in over twenty years to regain its old markets and enjoy the good will of the nation has received a serious setback.

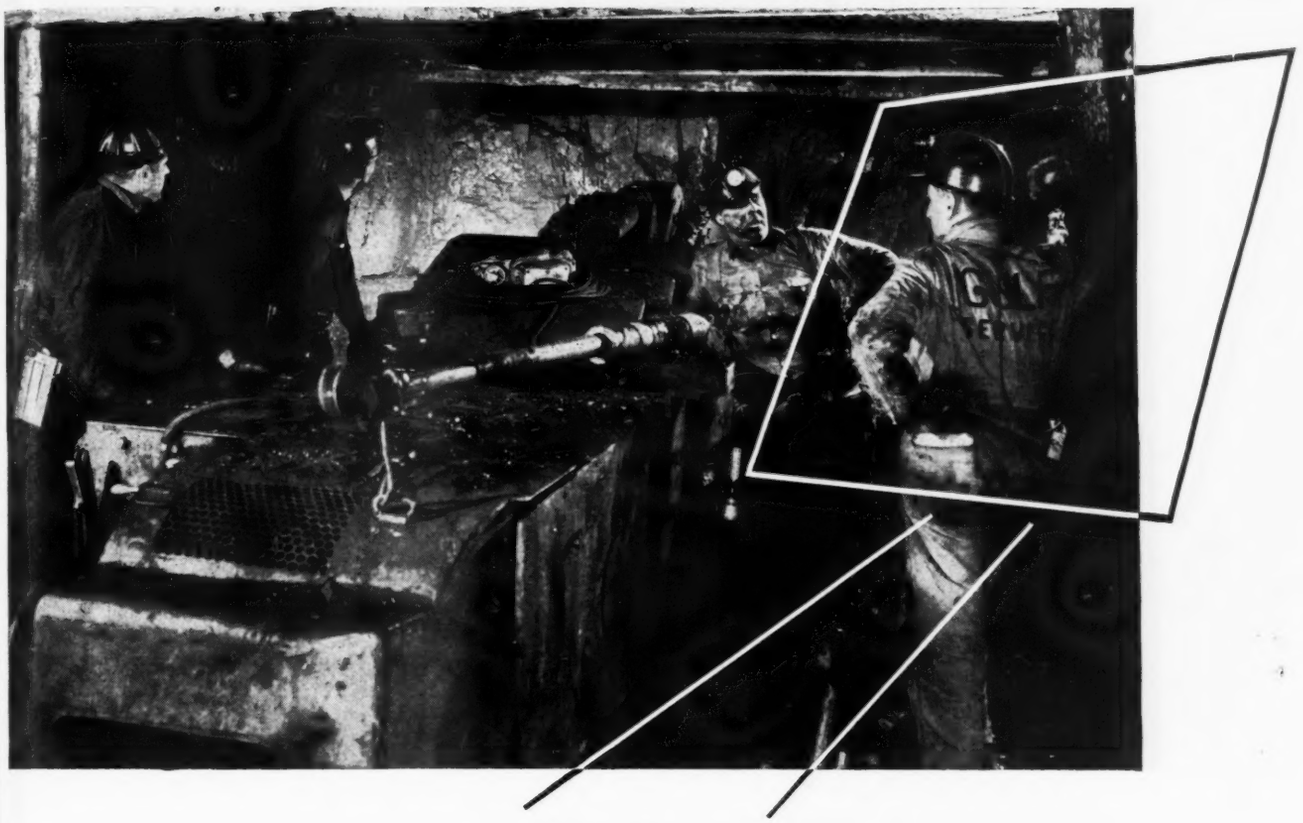
*Setting Sails for Peace*—For the close of the war, adjustment reserves should be provided even though coal mining, unlike many other industries, will not need reconversion to peacetime production. But after the war the coal industry will have, instead of delayed demand, only accumulated stocks of coal that will cause a sudden drop in sales and, during reconversion, other industries will make decreased demands for coal so that the price structure, unsupported by the Guffey Act, will collapse. Closed mines and bootlegging will result.

Slow time or shut downs will require "working" capital and how can it be provided without reserves? Those mines that work will have to provide for financing the projects and for the maintenance that the war has deferred, yet the Bureau of Internal Revenue will not permit deductions for such purposes. The mine operator (1) can, with other industries, seek an amendment of the 1942 Revenue Act or failing this, (2) set up even larger reserves, or (3) try under the present act to get the greatest possible tax exemption, to this end proving that constant wear and tear, shortage of labor and parts and inexperience of workmen justify such deductions. Demands for dividends, for equipment and for the purchase of bargain mines must be resisted in favor of cash, government bonds and debt retirement. The latter should not be delayed to retire preferred or common stocks. The coal industry's problem is to bridge the gap between the end of the war and the time when coal will be, for all practical purposes, the only economical source of heating fuel.

*When to Use Producer Gas*—Producer gas is the cheapest artificial fuel that can




"Fuddles, I find your blackouts down there rather ineffective."



## When the Gulf Lubrication Service Engineer is

# "in the picture"

## mine equipment operates at peak efficiency—

***The helpful cooperation of Gulf Lubrication Service Engineers contributes to greater production, fewer mechanical troubles and lower expense and maintenance.***

There is a big plus value in using Gulf quality lubricants, which is being converted into many operating benefits in hundreds of leading mines. This extra value is the helpful cooperation extended by Gulf Lubrication Service Engineers.

With years of training and practical experience in many mines as a background, Gulf Lubrication Service Engineers *know how* to minimize wear and make equipment give top performance by the scientific application of the proper lubricants.

Let a Gulf Service Engineer assist you in placing the lubrication of your equipment on the most efficient basis possible. It is more than likely that improvements can be made.

***For victory—***
buy United States
War Bonds
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GULF INDUSTRIAL LUBRICATION

**GULF OIL CORPORATION · GULF REFINING COMPANY**
*Gulf Building, Pittsburgh, Pa.*

be made from solid fuel, according to D. B. Hendryx, chief engineer, Harbison-Walker Refractories Co., but if natural gas or fuel oil is available at a reasonable price or if coke-oven or blast-furnace gas can be used, one would hesitate to build an expensive gas-producer plant with its attendant dirt, heat and operating difficulties, and if no more than 1,500 lb. of coal are to be used per hour, a gas producer seldom is justified. Mr. Hendryx presented a table, stating that depreciation is an appreciable part of the cost, but once the plant is built, it becomes a negligible factor. With a large plant it may be 48c. per ton and with a small plant 96c.

*When to Use Coke or Anthracite in a Producer*—If much heat is required and if the gas can be burned in the furnaces at a few ports instead of from a large number of individual burners, and if the producers are located near the furnaces, selection would favor hot raw gas from bituminous coal. Reverse those conditions and anthracite or coke might be the preferable fuel even if more expensive. Vaporized tar is likely to be present in the gas from any coal having more than 35 percent of volatile matter, but that is not so detrimental if the gas is to be burned close to the producer-gas plant.

The ideal producer fuel would be 2- or 3-in. lump coal with all fines below ¾ in. screened out, a fusion point of about 2,500 deg. F. and so free-burning that the top of the bed would not become a sticky caking mass. In actual practice, however, mine-run or slack often are used despite lowered capacity. Gumminess can be avoided by raising the temperature. Ash percentage is less important than fusion point, and low-fusion coals can be handled by using more steam in the blast.

Many producer-gas installations are operating on 500 to 600 lb. of coal per hour, said L. L. Swift, Wellman Engineering Co., Cleveland, Ohio, but under normal conditions, 1,500 lb. is a minimum. Mr. Swift said $1.75 per ton of coal for gasification cost and depreciation is "pretty high," for a producer has a life of 5 to 20 years. Industries were using 1¼- and 1½-in. bituminous coal but, with anthracite, rice coal is being used, and his company is trying even to make gas from barley coal. In reply, Mr. Hendryx said that higher efficiencies could be obtained than he had assumed (61 percent), but with poor coal and actual operating conditions no more would be obtained.

*Predicting Breaks in Oven Walls*—A new, and probably an improved, approach to a laboratory determination of the expansion of coals when being coked in commercial byproduct ovens was described by Charles C. Russell, chemical engineer, for himself and Glenn C. Soth, assistant research chemist, Koppers Company research department, Kearny, N. J. From a test of less than a pound of coal it can be ascertained whether any specific coal or blend of coals will push unduly against oven walls, but these results will be negatived if the bulk density, heating schedules, moisture content or fineness of coal are changed.

### End Speed in Coking

*Speed in Coking Increases Toward End*—Coking progresses ½ in. per hour from the oven wall to the center until the last phase of the process, when the plastic seams meet in the center of the oven. Then the temperature of this central seam will rise rapidly because no material is left to take and use that heat to complete its own plasticity. Once the two plastic seams meet the central plastic seam becomes solid coke in an hour or less. The coke may be at 500 deg. C. at the walls and at the oven center at 1,100 deg. C. In the last phase, the low-temperature coke becomes high-temperature coke with evolution of gas rich in hydrogen.

*High Volatile Has Most Shrinkage*—By several test methods, said Mr. Russell, the U. S. Bureau of Mines arrived at the conclusion that all cokes, regardless of the maturity of the coal from which they were derived, shrink about the same extent, 10 percent on a linear basis on heating from 500 to 1,000 deg. C. However, experiments made at Kearny to ascertain the total shrinkage—that between the point of maximum expansion and 1,000 deg. C.—proved that it varies measurably. With coal having 17 percent of volatile the shrinkage is 8.95 percent; 38 percent of volatile, 12.34 percent, a difference of 38 percent, but this is not in direct proportion to the original volatile-matter content of the two coals or to the volatile matter left in the semicoke at the end of the plastic range. Over the plastic range also a change in volume occurs.

With many low-volatile coals, the fluid-

FOR LOADING

Let the PHILLIPS Loader Carrier haul your heaviest loading machines to the job! With only three inches head room—construction features make it an ideal general utility car for heavy and bulky loads. Timken Roller Bearings, wheels removable for loading, wide treads for short curves, built for any track gauges.

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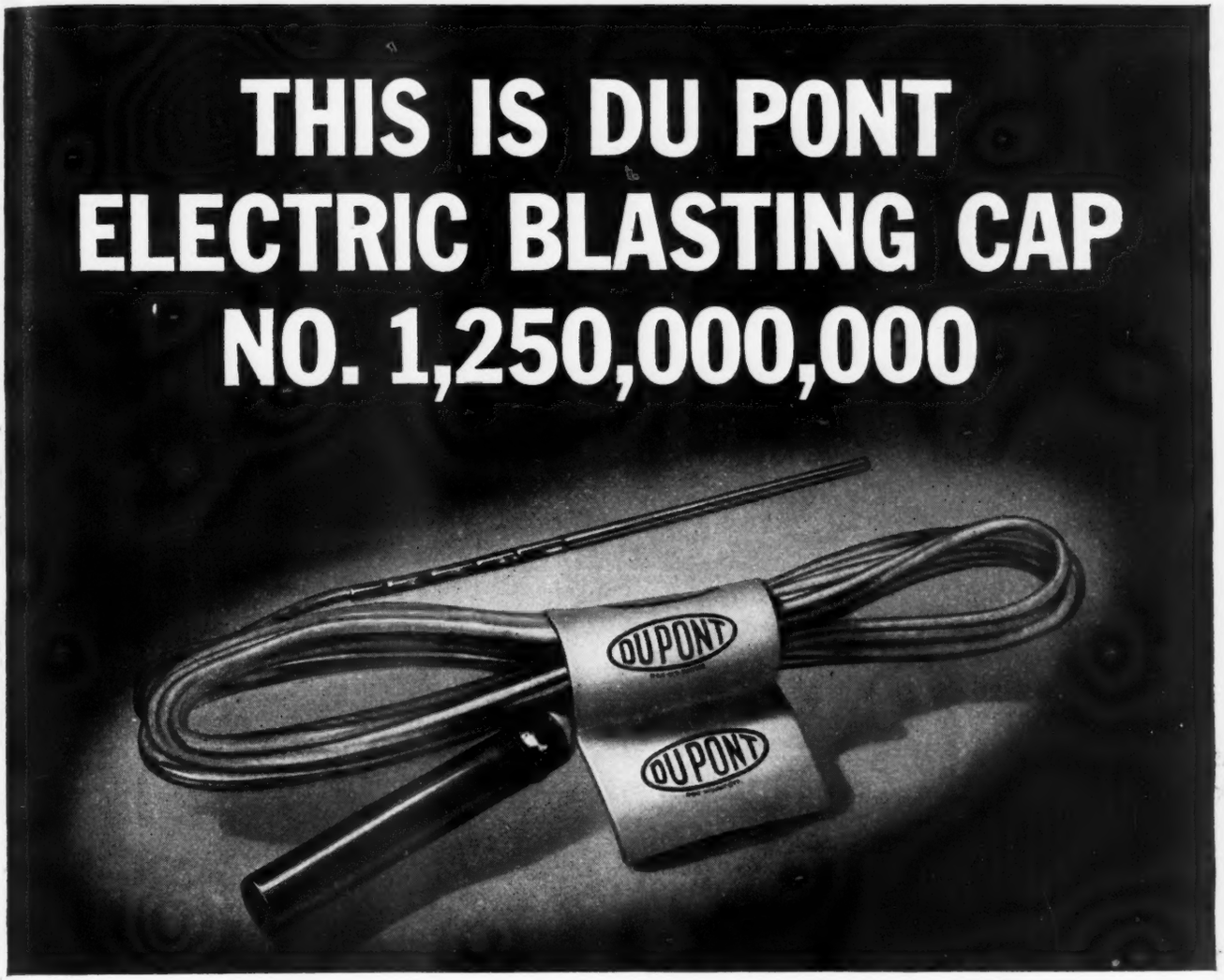
# THIS IS DU PONT ELECTRIC BLASTING CAP NO. 1,250,000,000




THERE was no cheering when this Electric Blasting Cap left the "assembly line." Like the millions before it . . . it embodied the latest improvements in cap design and had been manufactured to the same high standards that have made Du Pont Electric Blasting Caps preferred by users everywhere.

Hundreds of companies "bank" on the dependability of these caps. They know from experience that they can rely upon them. And this is not surprising because, for more than 45 years, Du Pont Electric Blasting Caps have been giving users satisfactory performance.

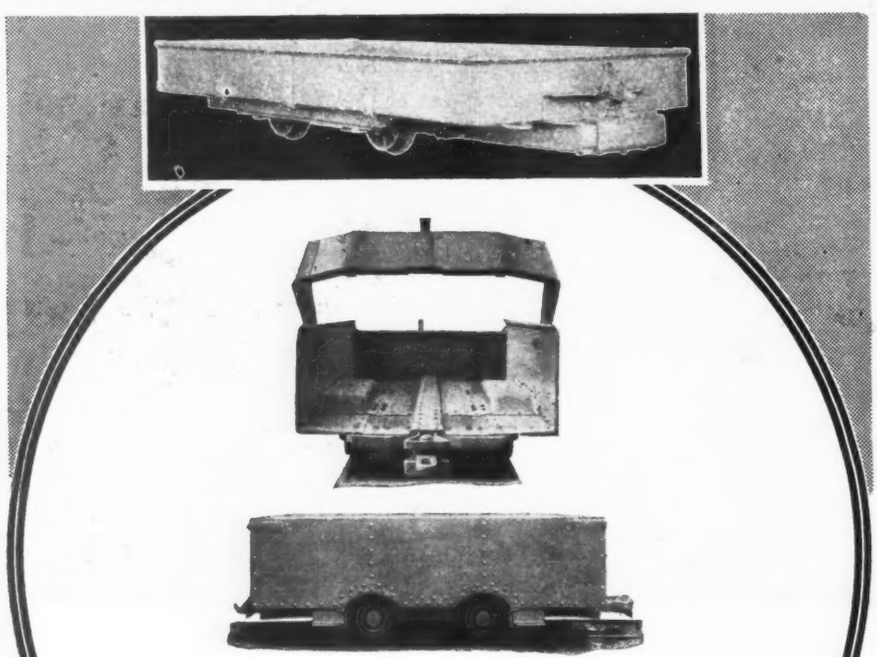
The metal shunt that protects the user against accidental firing, and the handy figure 8 method of banding the caps, are additional features which add to their safety and convenience. Remember, the most dependable detonator is the safest detonator. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington, Delaware.

## DU PONT *Electric* BLASTING CAPS

DU PONT
REG. U.S. PAT. OFF.

ity, as measured by the Gieseler plastometer, is never more than $1.5 \times 10^8$ poises and often remains below $10^6$ poises, thus offering high resistance to the escape of volatile matter from the plastic layer. Though with low-volatile coal much less volatile matter is evolved during that stage than with the usual blends of coking coals, the high resistance of the plastic layer to its escape creates high pressures. Further, the change in volume during carbonization is such that the charge is expanding throughout the carbonization period much more than could be compensated by coke shrinkage. These factors point to dangerous pressures which increase as carbonization proceeds.

*How Forecast Is Made*—In the Gieseler curves, resistance to motion in the plastic mass (poises) are plotted as ordinates with temperatures as abscissas. The authors conclude that, on the ascending slope of the curve, the temperature at which the viscosity of the softened coal system becomes $1.5 \times 10^8$ poises affords a primary indication of what the magnitude of the peak pressure will be at the moment when the plastic seams meet. Equally important is the length of the pressure interval from this ordinate to that of solidification on the descending portion of the Gieseler curve. With these indications, it has been found possible to forecast the pressures on the oven walls, though the authors predicate that there may be exceptions of which they, as yet, have no knowledge.

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INDUSTRIAL DIVISION

PITTSBURGH, PA.


*How to Make Coal-and-Oil Mixtures*—For best results, in the making of coal in-oil fuels, the solid material should be a bituminous coal of low-gravity and the oil of high-specific gravity and high viscosity, said A. B. Hersberger, research and development department, Atlantic Refining Co., Philadelphia, Pa., for himself, J. F. Barkley and L. R. Burdick, senior fuel engineer, Division of Solid Fuels Utilization for War, Washington, D. C. Also, because of hindered settling, high coal content is essential to stability, so long as it does not exceed 36 percent by volume and thus make the mixture viscid. With finely divided coal in heavy fuel oils, viscosities became excessive at 40 to 50 percent of coal by weight relatively independent of the viscosity of the oil or its temperature.

A rapid increase in viscosity occurs between coal sizes of 200x230- and 230x325-mesh (U. S. standard screen). Viscosities decrease with agitation, especially when the particles are very fine. Suspensions are relatively stable at 77 deg. F. if the maximum particle size is not larger than 200-mesh, but at a higher temperature, 120 deg. F., the maximum size must be less or not larger than 230-mesh.

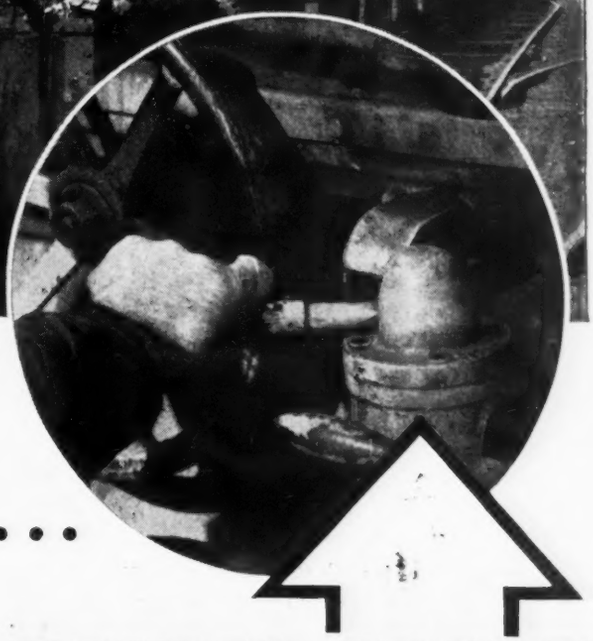
Vigorous mixing was found more effective in promoting suspension than passing the mixture through an homogenizer or a ball mill. Despite reports, lime-resin soap was found to be a poor stabilizer. Ten percent of coal-tar in the oil mixture shows stabilizing action.

*Coal-in-Oil In Industrial Furnace*—Tests at one of the boiler plants of the Atlantic Refining Co. were described by Dr. Barkley. The boiler was a 151-hp. long-drum straight water-tube Babcock & Wilcox unit with superheater and was first operated on oil and then on coal-in-oil fuel. The flame in the latter responded smoothly to boiler loads and to variations in the quantity of air used for combustion. Smoke could be controlled as well as with oil, but on starting up a cold furnace much smoke was made. Ratings from 40 to over 200 percent were carried for several hours without difficulty. About two-thirds more atomizing steam was needed for the coal-in-oil fuels than for oil. Troubles from the ash were less than anticipated. In general, much less ash trouble should be expected with coal-in-oil fuels. Combustion efficiency of coal-in-oil suspensions is likely to be slightly less than that of oil.

### 30,000,000-Ton Saving Planned

A saving of 30,000,000 tons of coal yearly is the goal of the National Fuel Emergency Council, said Thomas C. Cheasley, fuel engineer, Sinclair Coal Co., and now organizing the Council that is to save coal. Efforts will be made to induce consumers ranging from home owner to public utility, excluding, however, both of these, to be more economical in the use of fuel. The voluntary services of coal salesmen and engineers is being sought. They will be asked when calling on their customers and the customers of others to point out ways of economizing in the use of fuel in all the ramifications of such use, refrigeration being an example. If the industrialist thus addressed is not receptive to the suggestions of the councillor, no effort will be made to coerce him.

# When You Rebuild Locomotives



## Make a BETTER JOB *with* . . .

## *Westinghouse* HYDRAULIC BRAKE

The rebuilt locomotive is then able to handle heavier loads, at higher speeds, with greater safety. Graduated control permits accurate, time-saving spotting. Flexible fluid power, under finger-tip guidance, replaces slow, cumbersome hand braking. Operator fatigue is eliminated. More output is attained at less cost in man hours, equipment and maintenance.

No need for motor bucking and dragging brake shoes—the hydraulic brake does *all* the braking. Relieved of shocks the locomotive stays on the job longer. Motor repair costs are greatly reduced. No rebuilding of the existing brake system is required—the hand brake and levers are retained and the hydraulic brake devices readily added.

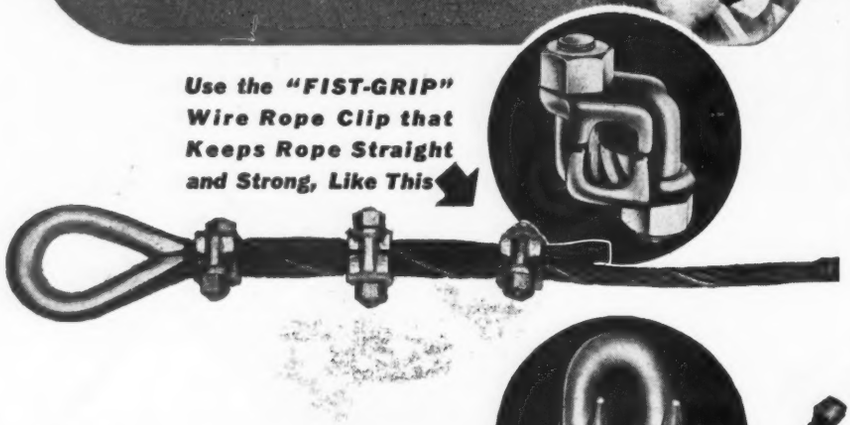
**TYPICAL RESULTS REPORTED BY ONE USER**

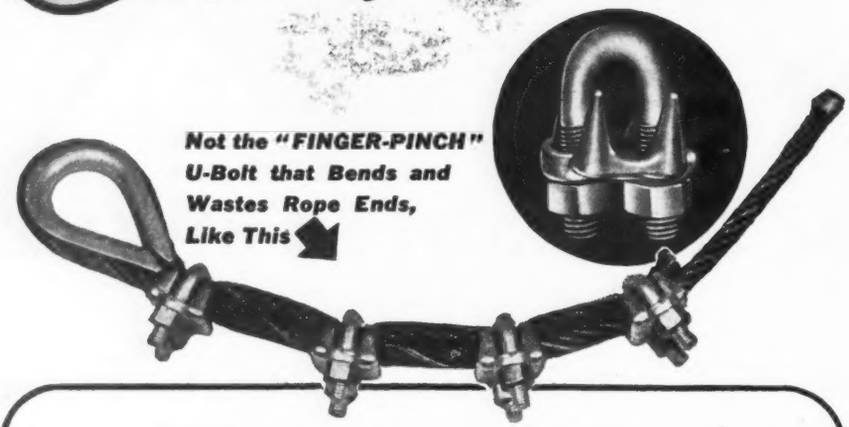
*Brake Shoe Life Increased from One Week to Three Months ★ Wheel Turning Decreased 50% ★ Motor Bucking to Check Speed or Stop, Entirely Eliminated ★ Shocks to Mechanical and Electrical Apparatus Greatly Reduced ★ Less Sand Required—Better Rail Contact Cuts Power Loss and Overheating.*

## WESTINGHOUSE AIR BRAKE CO.

**INDUSTRIAL DIVISION - WILMERDING, PA.**

# Here's Another Way to Make Wire Rope Last Longer




NOTE: The photographs of wire rope assemblies shown here are exact representations of two ¾-inch ropes fitted with recommended number of clips; all nuts on both wires uniformly tightened with indicating wrench. When "Fist-Grip" Clips are used, rope remains straight, whether or not load is applied.

Congratulations to you wire rope users cooperating with wire rope companies in Victory Rope-Saving Drive!

Laughlin "Fist-Grip" Safety Clips fit right in with your program. Don't risk wasting rope with bending, warping U-bolts.

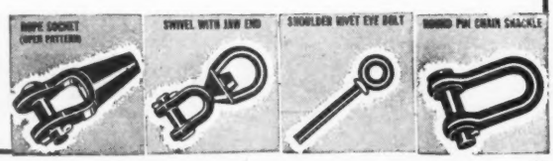
Save war-essential metals, too. Safety Clip design, with uniform vise-like grip, delivers full rope strength with less clips. Impartial laboratory tests prove 3 do the work of 4 U-bolts.

Finally, you save both time and man-power with Laughlin "Fist-Grip" Safety Clips. Identical halves—they can't be put on backwards, even by green men—fewer accidents! Nuts on opposite sides are faster to put on and take off. Design is stronger—and those drop-forged bolts are also plenty strong. Bolt ends don't protrude, don't become battered and useless.

Save rope—clips—time—money—man-power—starting now!

THE THOMAS LAUGHLIN Company
PORTLAND, MAINE

*Look for Laughlin Products in Coal Mining Catalogs*





## COMING MEETINGS

American Institute of Mining and Metallurgical Engineers: annual meeting, Feb. 20-24, 1944, Waldorf-Astoria Hotel, New York City.

American Society of Mechanical Engineers: annual meeting, Nov. 29 to Dec. 3, Hotel Pennsylvania, New York City.

## New Diamond Mine

Diamond Coal Mining Co., Knoxville, Tenn., has leased a tract of 6,500 acres at Rosedale, Tenn., on the Tennessee R. R., which is being opened. Tapping the Dean seam, which averages 54 in. in thickness, it is expected to be in operation by May 1, 1944.

•

## Mining Town Girls Model in New York

Eight fashion models—all amateur mannequins from the coal fields of Kentucky, Pennsylvania and West Virginia—appeared in the "Coal Town Clothes" review held Nov. 1 at Huntington, W. Va., and all made the trip to New York to participate in the "Preview of Thanksgiving Fashions," Nov. 10, being sponsored by Bituminous Coal Institute. The girls are: Irene Smith, Man, W. Va., who appeared as "Miss Mallory" in the Huntington Fashion Show; Bobby O'Dell, Northfork, W. Va., "Miss Koppers Coal"; Reable Tinsley, Jenkins, Ky., "Miss Consolidation Coal"; Anne Sadler, Library, Pa., "Miss Pittsburgh Coal"; Mary Jane Seligh, Holden, W. Va., "Miss Island Creek"; Irene Wooten, Glover, W. Va., who modeled as "Miss Marianna"; Betty Sturm, Fairmont, W. Va., another "Miss Koppers Coal," and June Rose, Bartley, W. Va., "Miss Pond Creek" of the Huntington review.

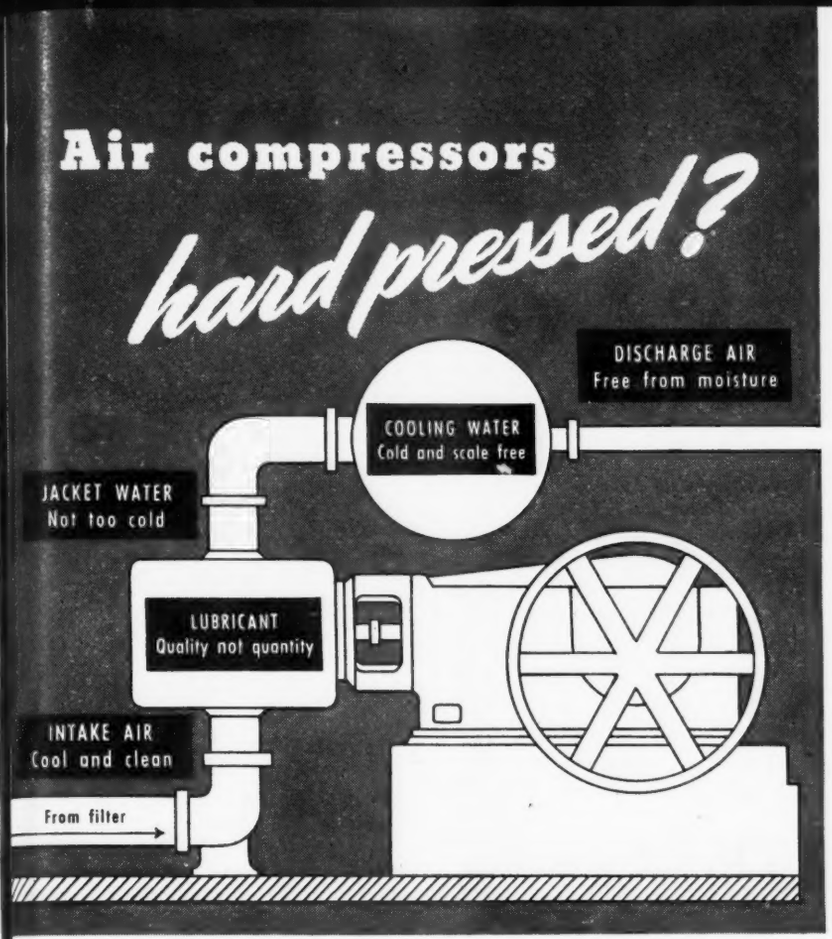
•

## Roof and Water Talks Mark Anthracite Meet

How accidents from roof falls in heavily folded beds may be prevented and how the flow of water into mines can be checked by sealing cracks in stream beds were two subjects discussed at the autumnal meeting of the Pennsylvania Anthracite Section, American Institute of Mining and Metallurgical Engineers, Scranton Club, Scranton, Pa., Oct. 29, with 135 persons in attendance.

The roof-fall discussion was introduced by a paper written by George A. Roos, general manager, and Harry A. Leidich, safety engineer, Philadelphia & Reading Coal & Iron Co., Pottsville, Pa., and that on the sealing of cracks in stream beds by Charles J. Golden and Vaughan H. Wilson, mining engineering department, Hudson Coal Co., Scranton, Pa. This latter paper appears in this issue (p.00).

Discussion on the safety paper was led by James H. Pierce, Pierce Management.




# Here are some suggestions to help keep them out of trouble

CONDITIONS under which compressors operate, particularly under today's heavy loads, tend to cause excessive deposits. Improper lubrication is not always responsible for these deposits, but a compressor lubricant with the right qualities can reduce or eliminate many of them. The causes of some of the more common compressor operating problems and suggested cures are listed here:

**Unstable Oils.** Oxygen in the air and heat generated by compression tend to oxidize conventional oils, causing the formation of carbon and asphaltic substances which deposit on valves.

Keep intake air temperatures as low as possible. Be sure inter-coolers and after-coolers are supplied with an ample flow of cold water to keep air temperatures as low as possible. Keep this equipment clean and free from scale and rust. Use Stanoil from which the unstable hydrocarbons—those affected by heat and oxygen—have been removed, eliminating many troublesome deposits at the source.

**Dirty Intake Air.** The enormous volume of air required by compressors, particularly under heavy load, may introduce a large quantity of dirt and dust.

Be sure conditions have not changed which might increase such contaminants in the intake air in your compressors. Use efficient air screens and keep them clean. Use Stanoil which resists the formation of gummy deposits that might collect dirt and dust from the air and add to deposits on valves.

**Condensation in Cylinder.** Cooling water temperatures are extremely important. If water supplied to the cooling jacket is excessively cold, it will cause moisture in the compressed air to condense. This will wash off the lubricant film and cause excessive cylinder wear.

Preheat jacket cooling water by running it through the inter-cooler, or reduce the flow so that the temperature of the water when it leaves the water jacket is not below 100° F.

**Condensation in Inter-coolers.** Water in the inter-cooler should be cold enough to condense the oil and moisture in the compressed air, so that they can be removed before they enter the high pressure cylinder and cause excessive deposits.

Be sure an ample flow of cold water is supplied to the inter-cooler. Drain condensed oil and moisture from inter-coolers and after-coolers frequently if they are not provided with automatic outlets.

**Over-Lubrication.** Over-lubrication is the cause of much compressor trouble. In compressor operation, oil is not burned up as it is in internal combustion engines, nor is it washed away as it is in steam engines. Oil remains in the compressor cylinder a long time, and if it is of the right quality, very little is needed. An excessive amount of oil increases the possibility of deposits in valves, inter-coolers, and air lines.

Adjust oil feed to the minimum necessary to give an adequate film of lubricant on cylinder walls. Compressors usually require from one-fifth to one-tenth as much oil as steam cylinders of similar size. Because of the high lubricating quality of Stanoil, only a very small amount is needed to secure adequate lubrication.

*Oil is Ammunition . . . Use it Wisely*

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**STANDARD OIL COMPANY (INDIANA)** STANDARD SERVICE



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Scranton, who commented on the relative responsibilities of management and workers in accident prevention. Recent floods have brought home the importance of restoring the integrity of stream beds, thus saving pumping costs and avoiding shutdowns, yet the paper on sealing explained that sealing costs are nominal in comparison to the savings effected. Discussion was led by Edward Griffith, vice president and general manager, Glen Alden Coal Co., Scranton, Pa.

Nominations for the ensuing year are Evan Evans, vice president and general manager, Lehigh Navigation Coal Co., Lansford, Pa., chairman; L. D. Lamont, division superintendent, Philadelphia & Reading Coal & Iron Co., Pottsville, Pa., vice chairman; also the following as members of the executive committee:

C. A. Gibbons, general manager, Susquehanna Collieries Co.; H. W. Montz, mining engineer, Lehigh Valley Coal Co.; W. C. M. Butler, president and general manager, Central Pennsylvania Quarry, Stripping & Construction Co.; Harold M. Smyth, president and general manager, St. Clair Coal Co.; Cadwallader Evans Jr., general manager, Hudson Coal Co.; H. D. Kynor, general manager, East Bear Ridge Colliery Co.; D. C. Helms, mining engineer, Lehigh Navigation Coal Co.; W. H. Lesser, mechanical engineer, Pierce Management; Carroll A. Garner, vice president, Jeddo-Highland Coal Co.; Henry H. Otto, mining engineer, Hudson Coal Co.; R. Y. Williams, operators' representative, executive committee, Anthracite Industries, Inc.; H. B. Stockett, general manager, Locust Coal Co.; Robert L. Klotz, explosives engineer, Hercules Powder Co.; and Messrs. Roos and Griffith.

Mr. Evans presided and Mr. Otto was chairman of arrangements. The next meeting will be held in Pottsville.

•

## Hanna Buys Coal Tract

M. A. Hanna Co. has purchased a coal tract south of Moundsville, Clay Township, W. Va., on the Ohio River. Though plans for opening up the property are indefinite, drilling is being undertaken on the Ohio River to ascertain the feasibility of tunneling the river to bring coal from the tract to the surface on the Ohio side.

•

## Canadian Miners Defy Union Order

Despite orders of District 18, United Mine Workers, to return to work, a large part of the 8,500 miners out on strike in British Columbia and Alberta had refused to return to work on Nov. 18, prolonging the 11-day work stoppage which hampered Canadian coal production last month.

Settlement of the strike, cause of which was the union's demand for a $2 a day increase in wages, was announced in Ottawa Nov. 13. However, many of the miners refused to return, and all mines of the Western Canada Bituminous Coal Operations' Association were idle. At Michel, B. C., miners voted to continue absent until the settlement of a Royal Commission investigating their demands is made known. Most miners in the Lethbridge fields were back, but at the big Crow's Nest field, operations were at a standstill.

Despite the labor troubles, E. J. Brunning, Dominion Coal Controller, announced on Nov. 11 a lifting in certain sections of restrictions on buying coal. Under certain circumstances, consumers in Ontario were permitted to buy 3 tons at a time. Under the order, any consumer having 15 days' or more supply in his bins was not permitted to buy coal, and only 1 ton could be delivered to those having less than 15 days' supply. The easing of the order was regarded as purely temporary.

The stoppages began Nov. 1 in the Nanaimo and Calgary districts in British Columbia. A delegation of District 18 visited government officials in Ottawa on Nov. 5 and returned west with what was described as a government proposal to the miners. The Royal Commission has been holding hearings in various fields in British Columbia and Alberta, and mailed its findings to Ottawa Nov. 18.

Striking Edmonton miners, meeting Nov. 6, passed a resolution making any miner who returned to work without consent of the strike committee subject to a fine of $100 and expulsion from the union for 99 years.

Meanwhile, on Nov. 4, it was announced at Ottawa that an "order-in-council" had been passed on Oct. 14 providing

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BEARINGS
There are standard CJB Ahlberg Ball Bearings and Bower Roller Bearings for most applications. Whether you are building new equipment or modernizing present equipment, CJB AHLBERG Ball Bearings and BOWER Tapered Roller Bearings will do the job efficiently, economically and satisfactorily.
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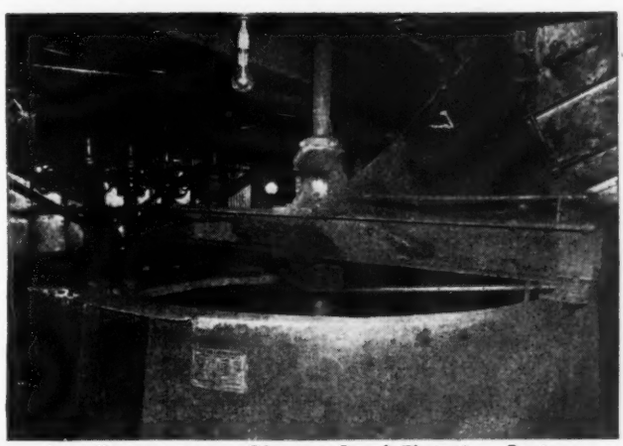
## PAYS DIVIDENDS IN PLANT OPERATION

• All the way through, from mine feed to railroad car, FAIRMONT has the experience and imagination for completely undivided responsibility in designing, engineering and equipping plants best suited to your particular preparation problem.

Whether your need is for a Dry or Wet Cleaning Process, or a combination of both, you can depend on FAIRMONT Engineers to obtain maximum benefits for you in washing, cleaning, sizing and blending.

Call in FAIRMONT Engineers for help in designing your new preparation plant, or if you are planning on rejuvenating your present plant FAIRMONT will help you redesign to produce more and better coal.

## CHANCE SAND FLOTATION SYSTEMS



Installation view—Chance Sand Flotation System.

TRADE MARK REGISTERED

## FAIRMONT MACHINERY COMPANY

FAIRMONT, W. VA.

for fines and imprisonment for any person taking part in a coal strike. The order, published in Canadian War Orders and Regulations, according to a Labor Department spokesman, applied to the Alberta and British Columbia stoppages. The order also prohibited lockouts.

The labor troubles were reflected in production figures released Nov. 11 for September, showing 1,441,270 tons mined that month against 1,469,672 last year. Total for the first nine months of 1943 was 13,126,656, a reduction of 6 per cent from last year's figures. Imports for September were 3,619,827 tons against 2,972,468 for last year, putting the nine-month total at 20,432,551 tons, against 18,418,781 last year.

The Wartime Prices and Trade Board announced maximum prices and mark ups for coal imported into Canada from the United States by rail and sold by wholesalers to other wholesalers or retailers. No wholesaler, under the order, may include in his selling price per net ton "more than the amount equal to the markup that he actually included in his selling price during basic period Sept. 15 to Oct. 11, 1941, and in any event, not more than 45c. a ton." The maximum price was fixed as the sum of the price paid to the United States dealer (in no case to be more than the price fixed by OPA), plus transportation, customs and excise charges and the maximum markup.

Additional threats to Canadian production cropped up in the form of wage demands late in November. In Nova Scotia, simultaneously with an announcement that agreement had been reached on means of increasing the output of the province's mines, the miners announced Nov. 20 that they were out for a wage increase of $1.25 a day, plus other concessions in tonnage and other rates.

Members of the Mine Workers' Central Union of Estevan and District voted Nov. 16 to strike Dec. 1 unless demands for higher wages and recognition of one union for the entire field were met.

With most of the men back by Nov. 22, a vote was held on the recommendations of the Royal Commission. These recommendations included a wage increase of $1 a day and two weeks' vacation with pay each year, effective Nov. 1 for employees at work on that date and on the date of resumption of work for all other employees. They were approved by the miners 5,269 to 3,166, according to an announcement.

•

## Says Coal Will Recover Losses to Gas and Oil

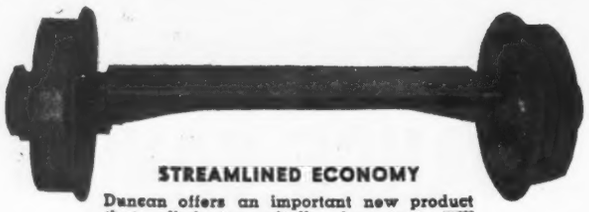
That coal will regain markets lost to gas and oil was predicted by Ralph A. Sherman, supervisor of the fuels division, Battelle Memorial Institute, Columbus, Ohio, in addressing a meeting of the Southeast section, American Institute of Mining & Metallurgical Engineers in Birmingham on Nov. 5. Taking as topic his "Fuels of the Future," Mr. Sherman explained that there was a growing need for the conservation of gas and oil resources, that coal constituted 89.9 percent of our fuel resources and that great progress was being made in the improvement of coal-burning equipment. He pointed out that both anthracite and bituminous coal bodies now have research programs under way designed to improve the utilization of these fuels.

Important experiments in the smokeless combustion of coal are being made at the University of Illinois and at Battelle, Mr. Sherman continued, and manufacturers are only awaiting the release of materials to come out with improved firing apparatus. He predicted there would be stokers of radical design after the war, and that there would be much improvement also in hand-fired stoves, furnaces and boilers.

Because of the different types of houses, Mr. Sherman said there would continue to be a market for different type heating systems including the stove, the hand fired furnace, the clinker-type stoker, the ash-removal stoker and the completely automatic plant, using gas or oil. However, he said use of coke for house heating would decline as the stoker gains, and that the stoker also would make inroads on gas and oil as needs to conserve these natural resources became more evident.

According to American Petroleum Institute figures, present petroleum resources in this country are sufficient to last 14 years and natural gas 32 years, Mr. Sherman said. He added there should be a definite national policy to conserve these resources as long as possible by improved utilization and by converting to coal. He


# Modern low cost answer to immediate mine-car needs··



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Duncan offers an important new product that eliminates vitally important mill shapes not now easily procured.

**SUPERIOR BY TEST**

The following results were obtained by placing two axles in hydraulic press, each bolted flat on face of press and bent to a 30° angle on each end of axle: CAST AXLE . . . 225 tons—ROLLED AXLE . . . 200 tons—neither axle showing a sign of fracture.

## DUNCAN Integral-Cast STEEL AXLE

***Eliminates the need of***

1 ROLLED AXLE

1 ROLLED CHANNEL

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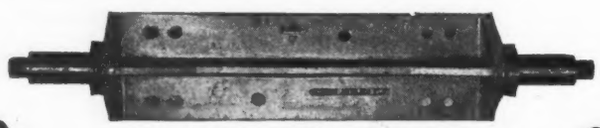
2 CAST-STEEL BOXES

Carefully controlled chemical properties and careful heat treating of cast steel axles will equal the strength of rolled axles. Cast axle weighs only 125 lbs. complete — eliminating 225 lbs. of weight.



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Duncan is headquarters for all steel mine car wheel and truck requirements; loose and tight wheels with ball, roller, or sleeve bearings; continuous and roller-bearing trucks, etc. Write us about your requirements.

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# SAVE TIME... POWER... STEEL...! Buy Bonds with the Savings..!

Use less power . . . fewer bits . . . cut more coal faster! The BOWDIL thin Cutter Bit, in service on your operations will—

**give 25% longer service life, cut 3 to 5 more places per set of bits, produce 25% to 30% more coarse cuttings.**

It's the design of the bits that gives results like this. The steel bars are rolled with concave faces, thus giving the finished bit ample clearance. This design also allows BOWDIL Concave Bits to be worn down 25% farther than standard bits . . . without increasing power demand or dust!

Don't wait . . . get in touch with BOWDIL today! Let us demonstrate how BOWDIL equipment can speed production and reduce costs!

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Canton COAL CUTTING EQUIPMENT Ohio

said coal could well be used to save half of the fuel oil now being consumed in this country. He added that the chief bar to converting coal to gas is the cost involved and that it would be better to make synthetic gasoline from natural gas than to transport it thousands of miles and then "dump" much of the supply for industrial uses.

Mr. Sherman also spoke of manufactured gas and said 79 percent of the supply went to the domestic market. He said there was need for improvement in the manufacturing process, as the price must be kept low if it is to compete with coal in the domestic field.

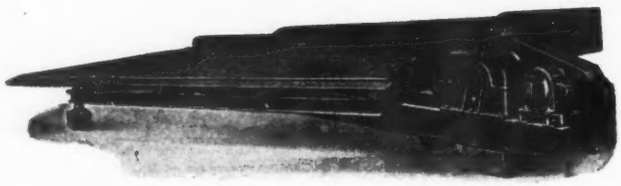
While the diesel engine is now threatening the iron horse, the speaker said the advantage in over-all cost of the diesel over a long period had yet to be established and that perhaps improvement in the efficiency of steam locomotives might change the present trend.

"As the cost of producing oil and gas increases and as the need for their conservation grows it is reasonable to assume that coal can and will take their place," concluded the speaker. The plan today, however, should be to use the fuel for the purpose for which it is best suited. "Let's put off as long as possible the expense that will be involved in converting coal to liquid gas."

The speaker added that more and more coal would be used in pulverized form and in chemical processes.


PREVENT BOTTLENECKS

with SuperDuty



Today's serious coal shortage demands the most efficient preparation . . . the greatest daily output of marketable coal from your mined coal. Don't allow your coal washing operations to become a bottleneck. Modernize with SuperDuty Diagonal Deck Coal Washing Tables—they assure maximum recoveries . . . save critical time and labor and increase daily output of marketable coal.

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## Wider Controls Asked for Ickes

Under a bill introduced Nov. 15 in the Senate, Secretary Ickes would be given administrative control over production, distribution and pricing of coal, oil and natural gas as solid fuels administrator for war and petroleum administrator for war.

The authors of the measure, Senators Reed (R., Kan.), Clark (D., Mo.) and Wherry (R., Neb), said it was to implement the recommendations of a special Senate committee which investigated the fuel situation in the Middle West.

Under its terms, Ickes would assume control over functions now handled by the OPA, the Office of War Mobilization, Office of Economic Stabilization, WPB, ODT and NLRB.

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## Personal Notes

THOMAS J. NEWTON, for 24 years associated with the Adonizio coal interests which include the Duryea-Anthracite Coal Co. and William Penn Coal Co., has resigned as secretary of that company to assume the presidency of the Jones Coal Corp., Middleport, Pa. Mr. Newton succeeds A. B. Shutts.

FRANK WHITE, former assistant division superintendent, Taylorville, Ill., has been appointed assistant to D. H. Devonald, general superintendent, Peabody Coal Co., Chicago.

JOHN ABRILL, superintendent, Peabody Coal Co. No. 7 mine, Taylorville, Ill., has been promoted to assistant division superintendent at Taylorville.

WILLIAM STARKS, son of J. W. Starks, division superintendent Peabody Coal Co., Taylorville, Ill., has been named as superintendent of No. 7 mine at Taylorville.

WILLIAM BURNETT JR. has been promoted from division electrician, the Peabody Coal Co., Taylorville, Ill., to electrical engineer with offices at Chicago.

C. M. MORELAND, formerly of the Logan, W. Va., field, has been named general manager of the Hellier Coal & Coke Co., Marrowbone Creek, Hellier, Ky.

B. P. MANLEY, executive secretary of the Utah Coal Operators' Association, has been named by Governor Herbert B. Maw to an inter-industry committee which will work on a program aimed to conserve strategic materials and services in industry until the end of the war.

THOMAS G. FEAR, safety director, Hanna Coal Co., St. Clairsville, Ohio, has been appointed chief engineer for the company. In addition to retaining jurisdiction over the safety department, Mr. Fear now has supervision over engineering, construction and the Georgetown central shops.

C. MILLARD DODSON, son of the late T. M. Dodson, has been named vice-president of Weston Dodson & Co. to succeed the late Caleb S. Kenney. Mr. Dodson is serving as a lieutenant in the U. S. Army and is a graduate of Yale University. He has been with the company since 1931. At the same time, Wes-

# Velvetouch BIMETALLIC FRICTION MATERIAL

*A scientific combination of Powdered Metals for brakes and clutches.*

## *AROUND THE GLOBE..*

Velvetouch is meeting rigid industrial and military requirements

**THE S. K. WELLMAN CO.**
1374 East 51st St., Cleveland, Ohio

*Pioneers in putting Powder Metallurgy to work for Industry . . . . . .*

# American MINE DOOR

## Mechanically Activated

Service records of American Mine Doors show years of use and constant working order because they are mechanically operated. Parts are sturdily made from finest steel for the purpose and mechanism has never failed that we know.

## Saves Accidents—Pays for Itself

Doors automatically open and shut for trips at full speed, saving trapper-boy accidents and maintaining safe air flow. Wages saved and increased hauling speeds make profits that quickly pay for Doors and continue to pay dividends. Write for complete catalogues.

**AMERICAN MINE DOOR CO.**

2057 DUEBER AVENUE CANTON, OHIO

FOR HEAVY DUTY DRIVES *specify* DE LAVAL WORM GEARS

The high efficiency and reliability of De Laval worm gears is especially valuable in continuous, 24-hour service. The efficiency approaches 97 per cent at some ratios and increases, rather than recedes, with use. Power is transmitted without vibration, chatter or shock. The only maintenance required is occasional inspection of the oil level in the casing.

The driven shaft can be extended to either right or left, or both, or either up or down, or both.

*Ask for Booklet W-1130 on "Industrial Applications of Worm Gears"*

**DE LAVAL WORM GEAR DIVISION**

of the De Laval Steam Turbine Co., Trenton, N. J.

MANUFACTURERS OF TURBINES · STEAM, HYDRAULIC PUMPS · CENTRIFUGAL PROPELLER, ROTARY DISPLACEMENT, MOTOR-MOUNTED, MIXED FLOW, CLOGLESS, SELF PRIMING · CENTRIFUGAL BLOWERS and COMPRESSORS · GEARS · WORM, HELICAL and FLEXIBLE COUPLINGS


ton Dodson announced that CHARLES D. BROOKS, formerly manager of the Philadelphia office, would become general sales manager, another position held by Mr. Kenney. Mr. Brooks has been with the company since 1940. P. J. MALLORY was named assistant sales manager.

L. L. NAUS, supervising engineer of the Bureau of Mines at Wilkes-Barre, Pa., since July, 1942, was presented with a watch at a farewell party given by fellow employees Nov. 13. Mr. Naus is leaving to take charge of the Denver, Colo., unit. His successor at Wilkes-Barre will be E. H. MCCLEARY of Pittsburgh.

JOHN T. SYDNOR, formerly vice-president in charge of operations, West Virginia Coal & Coke Corp., has been made president of the Rail & River Coal Co., Bellaire, Ohio.

W. R. BURGESS, New River & Pocahontas Consolidated Coal & Coke Co., has been promoted from assistant mine foreman of Kay Moor mine to inspector of mines for the New River division.

ANDREW KELLY has been appointed superintendent of the Poland mine, Hillman Coal & Coke Co., Poland Mines, Pa.

JOHN D. CLOUSE, controller, Walter Bledsoe & Co., Terre Haute, Ind., has been elected to membership in the Controllers' Institute of America.

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## Bootleg Hearing Off

Despite a recommendation by Governor Martin, of Pennsylvania, members of the State Anthracite Committee failed to set a date for hearing bootleg operators at their meeting Nov. 8 at Harrisburg. An end to bootleg anthracite operations has been ordered for Nov. 30.

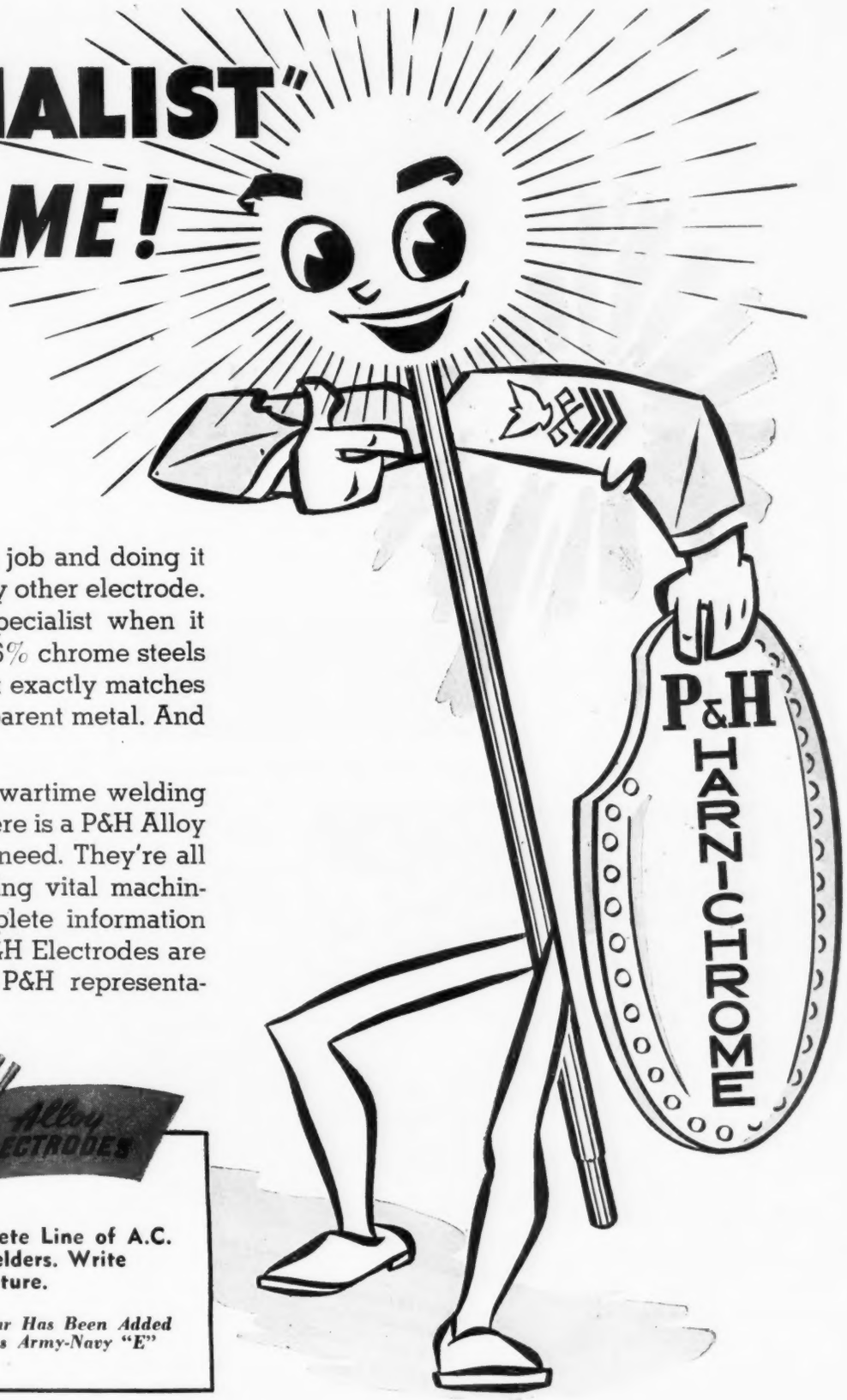
Independent operators appealed to Governor Martin following the order, and he recommended that their side of the case be heard. The Governor, after a conference with the Tri-County Independent Miners, Breakermen and Truckers' Association, said that the men told him they were operating on leased land.

The independent operators, in a meeting with the Anthracite Committee Nov. 17, offered royalties to landowners for coal dug on their properties. If that method fails, they said, they will seek another conference with Governor Martin.

Richard Maize, chairman of the committee, said the Nov. 30 deadline "stands for men working on coal lands without consent of the owner of the property." However, Governor Martin, on Nov. 20, as a result of further representations, set Nov. 23 as the date of a second conference on whether the ban should go into effect.

On Nov. 24, after a further conference with the governor brought no relaxation of the order, a representative of the bootleggers announced that work would continue after Nov. 30 "regardless of orders issued by coal companies." The companies, it was indicated by State officials, would be relied upon to enforce the ban by court proceedings for trespass.

# "SPECIALIST" that's ME!




I stick to doing one job and doing it well — better than any other electrode. What job? I'm the specialist when it comes to welding 4 – 6% chrome steels with a weld metal that exactly matches the properties of the parent metal. And I mean EXACTLY!

But whatever your wartime welding problems demand, there is a P&H Alloy Electrode to fill each need. They're all out for Victory, keeping vital machinery on the job. Complete information and procedures on P&H Electrodes are available from your P&H representative, or write us.

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**P&H Offers a Complete Line of A.C. and D.C. Arc Welders. Write for Literature.**

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*A New Star Has Been Added to P&H's Army-Navy "E"*

*General Offices:* 4540 W. National Avenue . . . Milwaukee, Wisconsin

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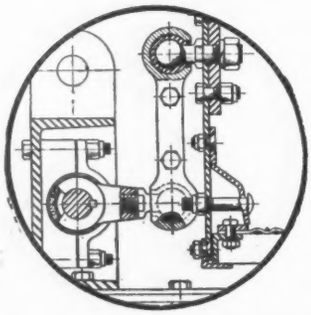
# More Tonnage!

Remember that the vibrating movement of SECO SCREENS is NOT merely a reciprocating motion—but is a full *circular gyration*—controlled so that every square foot of screen vibrates in the same plane—and produces maximum screening action—MORE TONNAGE.

SECO VIBRATING SCREENS



The simple, effective equalizer assembly on SECO Screens, which controls their vibration, is shown in the sketch opposite.

*Write for the fully descriptive Bulletin.*

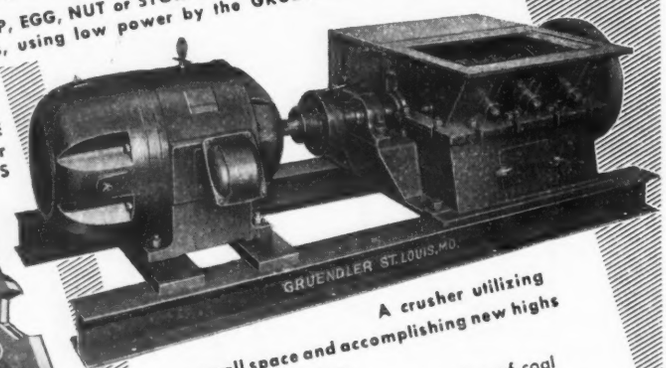
Screen Equipment Co.

GRUENDLER CRAFTSMANSHIP . . .
*Employed by Coal Producers*

SPECIFIC SIZES of COAL

● LUMP, EGG, NUT or STOKER SIZES produced with a minimum of fines, using low power by the GRUENDLER CRUSHER method.

*Patented . . .* TWO-PIECE HAMMERS or RING HAMMERS

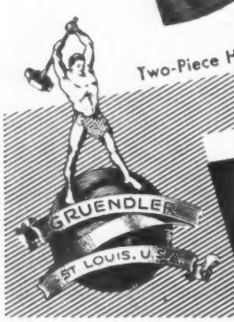


Ring Hammer

Two-Piece Hammer

A crusher utilizing small space and accomplishing new highs in coal production.

GRUENDLER builds a complete line of coal crushing equipment includes both single and double roll crushers. Bulletins sent on request.




GRUENDLER
CRUSHER and PULVERIZER Company
St. Louis, Mo.


# Posthumous Award To Clifford Saxon

Secretary Ickes announced on Nov. 19 that the first Interior Department Award for Outstanding Achievement had been given posthumously to Clifford E. Saxon, Birmingham, Ala., Bureau of Mines safety inspector who lost his life while engaged in rescue work at a Sayreton, Ala., mine explosion Aug. 30.

A citation honoring Mr. Saxon was read at a meeting of 1,000 workers of the Department. It said in part: "During the 22 years of his employment he participated in and many times directed rescue and recovery work at scores of mine disasters in Alabama and Tennessee." Of the tragedy at Sayreton, the citation said: "Mr. Saxon was called to participate in rescue operations . . . While he was in the mine, a second explosion occurred and eight members of the rescue party, including Saxon, were killed."

The award will be delivered to Mr. Saxon's widow. Along with it will go a war bond purchased by three Interior Department groups of employees, The United Federal Workers of America, the American Federation of Government Employees, and the National Federation of Federal Employees.

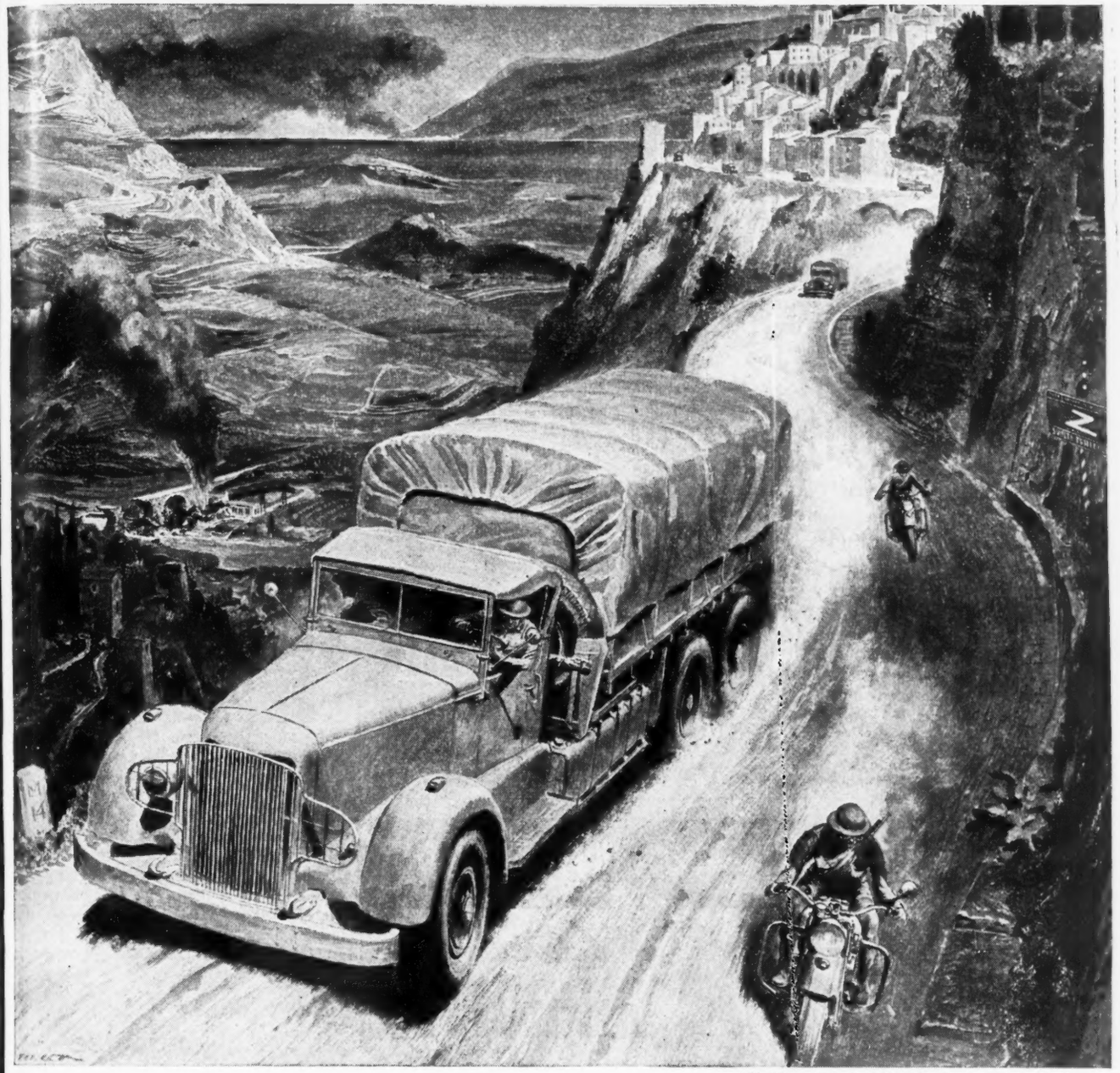
### Excellence Awards Made

Five awards of excellence were also announced by the Interior Department, two of them to employees of the Bureau of Mines. John F. Barkley, head fuel engineer, fuels and explosives service, and Wilburn C. Schroeder, assistant chief, fuels and explosives service, both received $200 yearly pay increases for their suggestions.

Mr. Barkley and his associates, the citation said, worked on increasing fuel economy and efficiency in government plants and over a ten-year period have saved $1,400,000 in cost of equipment. "They took in on themselves, Mr. Barkley and his associates, to recommend the kind of fuel," the award read, "to be used in a particular installation, taking into consideration the fuels available and the kind of service that must be given by the plant in question."

The contribution of Dr. Schroeder, the Department said, dealt with the nature and cause of a peculiar type of cracking in boiler steel which has led to explosions, loss of life, and costly repairs in boilers on locomotives and in large power plants. Mr. Schroeder has been conducting the work for a number of years and has almost completed his studies. Mr. Schroeder developed a test unit which would indicate whether chemicals in water were injurious to the boiler. Five hundred of them are in use in power plants, and the Department said installation of the units on 40 locomotives by an eastern railroad had saved about $50,000 annually in repair costs.

Others who received awards were James G. Lewis, senior engineering aid, Alaskan branch, Geological Survey; Mrs. Catherine J. Nonamker, clerk, Water Resources Branch, Geological Survey, and James L. Buckmaster, associate engineer, Alaskan branch, Geological Survey.



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*A big 10-ton, Diesel-powered Mack in grim war paint rushes supplies to the front. Sketched from photos, by Peter Helck.*

## WAR REPORT...WITH A PEACETIME TWIST?...

For your future reference, we'd like to put two facts on the record now. *Fact One*—there are *more* Mack Diesels in the United Nations' armies than any other make of heavy-duty Diesel truck. *Fact Two*—the only 10-ton Diesel trucks used by United Nations' armies which are made and powered by one manufacturer are Macks. This may surprise you . . . and it may mean a lot some day when *you* are deciding what Diesel to buy.

*Mack Trucks, Inc., Empire State Building, New York, N. Y. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J. Factory branches and dealers in all principal cities for service and parts.*

Mack

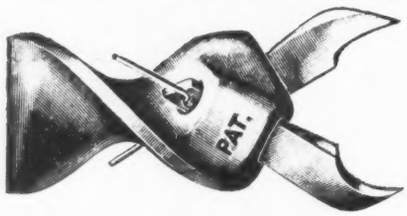
TRUCKS
FOR EVERY PURPOSE
ONE TON TO FORTY-FIVE TONS

BUY U. S. WAR BONDS

IF YOU'VE GOT A MACK, YOU'RE LUCKY...IF YOU PLAN TO GET ONE, YOU'RE WISE!

# TIGHTLY HELD *in the head*

## No Bit Losses—No Time Losses—No Production Losses




★ Just a little BIT dropped from its head means replacement, added costs, and delays in proceeding with the drilling. No such results with McLAUGHLIN POSITIVELY HELD BITS—once they are placed in the bit head they are in there for keeps until you want them out. No worries about vibration or sticking causing bit losses.

**McLAUGHLIN**
*Positively Held*
**BITS**

Arrange now for a test drilling in your mine—find out what McLAUGHLIN quality drilling equipment, backed by more than 20 years of experience, can do for you. It will pay you to know McLAUGHLIN quality and value.

McLAUGHLIN manufactures a complete line of heads, bits, and augers which are stocked and sold by mine supply houses in all major buying centers serving the coal mining regions.

**McLAUGHLIN**
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# MOSEBACH *Flashweld* RAIL BONDS

*Connecting Links between*
**POWER and PROFITS**

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Try Mosebach Flashwelded Rail Bonds for maximum coal production and subsequent profits for it is essential that you get the power you pay for at the face. The Mosebach patented Flashweld Process of welding provides an absolute connection between the forged steel terminal and each individual strand of copper cable. This assures maximum conductivity to maintain high voltage at the face.

Mosebach Flashwelded Rail Bonds are easy to install—all terminals are designed to provide large welding area for stronger, more efficient bonding. A complete installation of Mosebach Flashweld Rail Bonds will save you money on power, welding and replacement costs. Write for illustrated literature and prices.

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1115 Arlington Avenue Pittsburgh, Pa.


## Oil Spray Allowed

Secretary of the Interior Harold L. Ickes announced Nov. 11 that coal operators would be permitted to spray residual fuel oil on coal to reduce windage loss and prevent freezing. Deputy Petroleum Administrator Ralph K. Davies said stocks of residual oil had improved sufficiently to lift the ban against spraying. He estimated 5,000,000 tons of coal annually could be saved from windage losses alone.

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## Drilling in Vancouver

Drilling to determine the possibility of extended coal seams has started on provincial coal leases on Nanaimo Beach, Vancouver, by the Wingold Investment Co., a subsidiary of Watkins-Winraw Fuel Co., Vancouver, B. C. The leases were seized by the Provincial government during the last war and were the property of Alvo von Alvenslaben. First drill holes were put down near the Home Oil plant in the Breachin area.

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## Coal Cut in Britain

The British Ministry of Fuel and Power announced Oct. 29 that householders will be limited to 1,120 lb. of coal in southern England for November and December. For the rest of England, Scotland and Wales, an individual customer may purchase 1,456 lb. during that period. Increased allotments may be obtained only by special license. During the 1942-43 season, the figures were 1,400 and 1,680 lb. The decrease was ordered, the ministry said, in order to help meet declining production. The British coal situation was further aggravated on November 4 when 3,000 coal miners went out on strike in Durham.

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## N. C. A. Committee Begins Tax Study

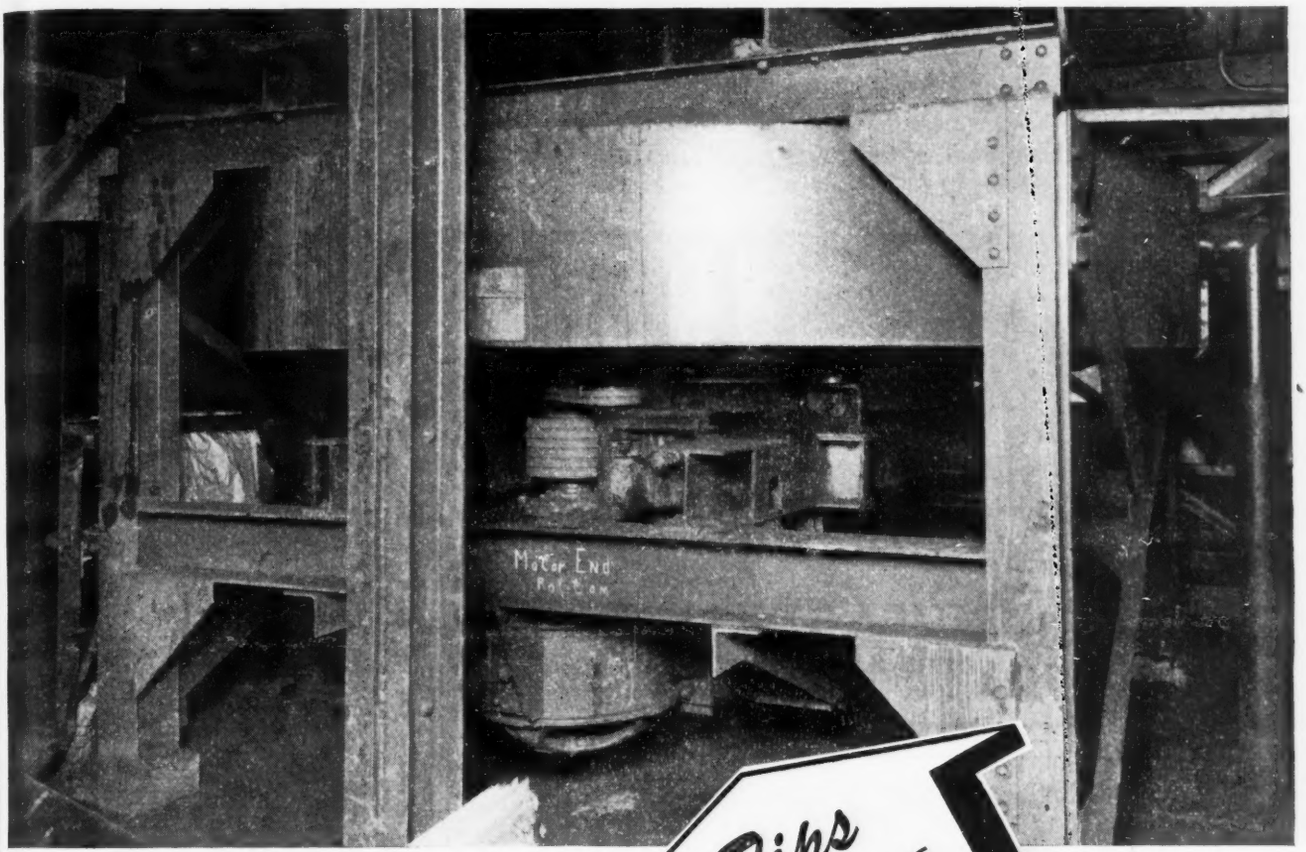
The new special tax committee of the National Coal Association held its first meeting in Washington Nov. 4 and assigned subjects to each of the ten members for study and report. The group, composed of tax experts of coal companies throughout the nation, named G. C. Crowder, assistant to the vice-president, Peabody Coal Co., Chicago, as temporary chairman, and James W. Haley, of N.C.A., temporary secretary.

N.C.A. President Fred S. McConnell and Executive Secretary John D. Battle told the committee its purpose was to study tax proposals affecting industry and to develop and recommend a sound policy for the Association.

The committee is soliciting views of NCA members of tax problems, and they should be addressed to the proper subchairmen at NCA headquarters, Southern Building, Washington. The subcommittee chairmen and their subjects are:

Mr. Crowder, deferred maintenance:

# BEARINGS *that lick friction*
## *ON C-M-I CENTRIFUGALS*

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CENTRIFUGAL & MECHANICAL INDUSTRIES, INC.

**The time has passed when the halting hand of Friction can cripple war production by slowing down shafts. It passed with the coming of antifriction bearings—and SKF Bearings in particular. For example: the shafts of this C-M-I Continuous Centrifugal is *friction-free* as this unit processes ⅜" to 1" coal at the rate of 50 tons per hour . . . reduces the free moisture content of coal from 20% to 25% down to 6% . . . reclaims much slurry or sludge coal that ordinarily would be thrown away. All because seven SKF antifriction bearings keep vertical shafts turning smoothly . . . easily carry radial and thrust loads . . . never require adjustments. The time is here for SKF Bearings . . . at all points of greatest wear.** 5389

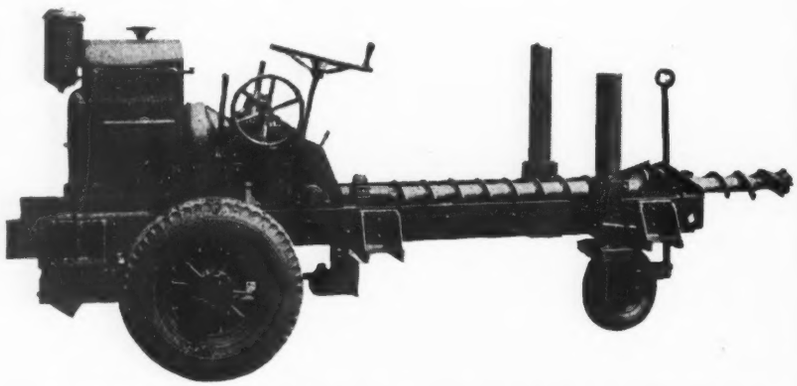
**SKF INDUSTRIES, INC., PHILA., PA.**

Tips
ON BEARING CARE
To make present equipment last longer
1. Use clean lubricant recommended by the manufacturer of this machine.
2. Avoid loads and speeds beyond those recommended by the manufacturer.
3. If necessary to remove bearings, keep them properly lubricated. Avoid the intrusion of water and dirt. Apply pressure on the inner race only. Don't hammer outer race.
SKF
BALL AND ROLLER BEARINGS

# PARMANCO Horizontal Drills

## "Positive Control Drilling"

Parmanco Horizontal Drills give you "Positive Control Drilling." Parmanco Vertical and Horizontal Drills are today's leaders in low cost, low maintenance drilling—All Parmanco Drills are equipped with patented Parmanco augers. Used by leading strip mine operators—Write us your drilling problems.



**PARIS MANUFACTURING CO.**

**PARIS, ILLINOIS**



**The SECRET of LONG WEAR in bearings and bushings for the coal mine industry**

***High lead bronzes and specific formulae for each application.***

PROMET — The Original High Lead Bronze

LOCOMOTIVE AXLE LINERS are made from Promet formula #18 which is tough, malleable, and with good wearing characteristics because its strength physicals are combined with a low coefficient of friction. This bronze will withstand the hammering and thrust to which axle bearings are subjected.

LOCOMOTIVE JOURNAL BEARINGS should have a low coefficient of friction and fair "physicals." For these reasons Promet #2-S is used. These Journals will stand up under a large amount of coal dust and other abrasives without cutting or scoring.

MAIN DRIVES ON MINING MACHINES are submitted to extremely heavy duty. Promet #6-SK is ideally suited for these applications.

EXTREMELY HEAVY BEARING DUTIES which are also subjected to impact, are supplied in Promet #89-S or 91-SK.

*Parts for Jeffrey, Goodman, Westinghouse, General Electric, Sullivan and Joy Equipment, etc.*

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ALTON, ILL., Frank E. Rhine, 623 Blair Ave. . . Phone Alton 3-8624


W. H. Peter, Hanna Coal Co., Cleveland, extension of benefits of Sec. 735 of the I. R. C. to new mines; H. L. Smith, comptroller, Island Creek Coal Co., Huntington, W. Va., allowable deductions for equipment, air shafts, etc., under regulation 103, extension of benefits of Sec. 735, I. R. C., to lessors: L. R. Colwell, Eastern Gas & Fuel Associates, Boston, depletion; G. W. Kratz, vice-president, Consolidation Coal Co., New York, increase in old age and survivors' taxes, unemployment tax program, federalization merit rating, etc.; A. E. Lamm, secretary-treasurer, United Electric Coal Cos., Chicago, corporation tax rates, including capital stock and declared excess profit tax; David N. Lewis, assistant comptroller, Rochester & Pittsburgh Coal Co., Indiana, Pa., withholding taxes; Elmo E. Allen, New River Co., Charleston, W. Va., property used in ordinary business; Roy O. Park, Sinclair Coal Co., Kansas City, Mo., wage stabilization; Edward Haag, tax department, Pittsburgh Coal Co., Pittsburgh, Pa., renegotiation of war contracts if this subject should become of primary importance to the coal industry.

•

## Ten Die in Mine Blast

Ten miners were killed Nov. 6 in an explosion at Nellis No. 3 mine, American Rolling Mill Co., Nellis, W. Va. The blast occurred at 7:30 p.m. when only a partial crew was on duty. Superintendent A. E. Oakley said 28 men were in the mine at the time, but the other 17 made their way to safety.

•

## Contracts Awarded For Texas-W. Va. Line

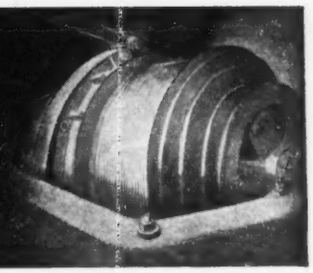
Four companies have been awarded contracts for the construction of a 24-inch natural gas pipeline from Corpus-Christi, Tex., to Kenova, Ky., near the Kentucky-West Virginia boundary. The line, 1,188 miles long, is a project of the Tennessee Gas & Transmission Co. The gas will be sold to the Hope Natural Gas and Columbia Gas & Electric systems.

The line will be solid welded construction throughout, with 85 miles of 18-inch pipe extending from Kenova to Cornwell, W. Va. Seven compressor stations having a combined horsepower of 58,000 will be located in Texas, Louisiana, Mississippi, Tennessee and Kentucky. The line will cross the Mississippi River on a highway bridge at Greenville, Miss. The schedule calls for delivery of pipe at a rate of 150 miles per month.

Meanwhile War Emergency Pipelines, Inc., announced that during the week of Oct. 31, Station 24, near Marietta, Pa., was completed and after adjustments have been made, the line will be capable of pumping at its full capacity of 300,000 barrels of oil daily to eastern refineries.

Pressure tests were due to be held last month on the 20-in. products line of WEP from Longview, Tex., to Norris City, Ill. Less than 75 miles of this line remained to be laid on Nov. 11.

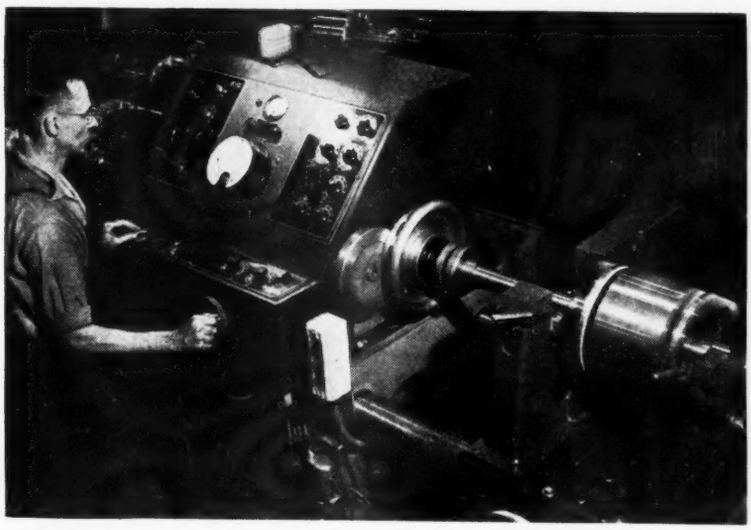
# TIPS FROM MANUFACTURERS



## Precision Balancing

Unbalance of armatures can be located in one-eighth to one-tenth the time required for mechanical balancing with a dynetric balancing unit used by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. It is possible, according to Westinghouse engineers, to precision balance armatures for 50- to 200-hp. motors to 1/10,000 of an inch of linear movement. In one month, 1,000 armatures were balanced on this machine.

The operator proceeds as follows when he balances an armature: (1) Places the shaft of the armature in floating bearings; (2) connects the armature shaft to that of a motor-driven sine wave generator; (3) adds a known weight of molding clay to one end of the armature at the 0 reference point of the sine wave generator index wheel; (4) rotates armature at 600 r.p.m.; (5) manually adjusts sine wave generator until the rotor is in phase with the stator, at which point the armature is in balance with the machine; (6) weight of metal necessary to bring one end of the armature in balance is read on the scale of the large instrument in center of panel. The horizontal movement of the armature, due to vibration, is transmitted by the floating bearings through a mechanical connection to an electrical coil, whence it is electrically transmitted to electronic tubes which amplify the unbalance so it can be recorded by the instrument; (7) sine wave stator index wheel indicates place on armature with respect to 0 reference point of the sine wave generator index wheel where the weight that was read on the instrument must be added to bring that end of the armature in balance. The operator then repeats these steps for balancing the opposite end of the armature.



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## Belting

Volume production of industrial belting made with synthetic rubber has been started by the United States Rubber Co. at its plant in Passaic, N. J. The program of mass manufacture, according to the company, is designed to alleviate the shortage of transmission and conveyor belting threatening war industries since sources of natural rubber were shut off.

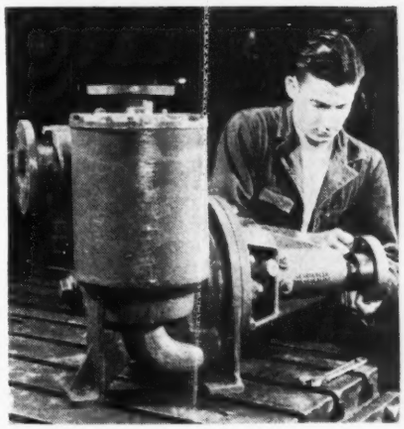
Cotton fabric, which forms the base of belting product, is made in various weights at the textile plants of the company and shipped to the Passaic plant for processing. The synthetic rubber is forced into the pores of the fabric by rollers. Vulcanizing requires heat reaching a temperature of 287 deg. F.

•

## Commutator Cleaner

Industrial Power & Equipment Co., Pittsburgh, Pa., offers the Industrial commutator cleaner, designed as a safety tool for electricians, machinists and motor inspectors in various industries including coal mines. It consists of a pulverized nonconducting abrasive, bonded into a uniform flexible material, securely fastened on an all-wood holder having 1¾x¾-in. face.

## Self-Priming Pump



Allis-Chalmers Mfg. Co., Milwaukee, Wis., offers a new self-priming pump, the Type AO, featuring an improved automatically controlled valve. The design and operation of its valve arrangement is said to be an important factor in the quick and effective self-priming action of this pump.

Priming is accomplished as the motion of the water through the pump runner and the volute passage carries behind it a slug of air, drawing air in the suction passage through the impeller and out through the priming chamber. This hydraulic action lifts the column of water in the suction line and achieves the same results as would a separate vacuum pump. The priming valve closes slowly during this process, acting against a spring tension which governs the rate of priming and the static height of the priming suction lift. The automatic closing of the valve after complete priming prevents water from bypassing back to the suction chamber, with resultant power loss.

The pump impeller has an unusually thick vane with rounded inlet edges, permitting the pump to pass stringy materials and fairly large solids. Two- and 3-in.-size pumps are now obtainable, but 1- to 6-in. sizes are to be produced later.

•

## Guard Extinguishers Against Freezing

Several common types of fire extinguishers are subject to freezing and, if allowed to do so, may be rendered inoperative or even dangerous to use.

Soda-acid, foam and gas-cartridge extinguishers must be kept in relatively

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Smart coal buyers demand clean Coal—uniformly sized and accurately blended. They're glad to pay more for it.

You can get those top prices. Install adequate preparation equipment . . . let better markets repay you many times over—a profitable investment.

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warm locations (above 40 deg. F. to be safe) or in suitably heated cabinets. The National Board of Fire Underwriters specifies that cabinets for use in sub-zero climates be of $\frac{7}{8}$-in. double-wall construction and be heated by a continuously burning incandescent lamp of not less than 50 watts. Single-wall inclosures, similarly heated, are suggested for locations where temperatures below zero F. are not encountered.

Anti-freeze chemicals, such as common salt, calcium chloride and glycerin, should not be added to extinguishers of these types, since foreign ingredients may reduce the effectiveness or change the nature of the discharge, or corrode the parts and make the extinguishers dangerous to use.

Pump-tank and gas-cartridge extinguishers can be protected by adding anti-freeze chemicals supplied by the manufacturer. Chemicals other than these should not be used, however, as they may cause corrosion.

Extinguishers which do not require protection from freezing are the vaporizing liquid, carbon-dioxide and loaded-stream types. The first two contain no water; the latter does contain water, but has chemicals added which depress the freezing point.

Since the sale of all Underwriters' Laboratories approved extinguishers is now subject to priority restrictions, careful maintenance, including protection against freezing and an annual inspection and recharge, is doubly important.

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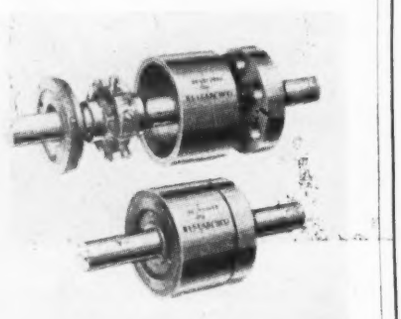
## Centrifugal Clutch

Amalgamated Engineering & Research Corp., Chicago, offers a new type of automatically engaging and self-disengaging centrifugal clutch which, it is said, can



serve either as a coupling between shafts or as a driving pulley or gear in a transmission, as well as a starting cushion between power units and driven mechanisms.

Known as the Torkontrol, it consists of a partially filled oil chamber fitted with a freely rotating hub which carries a series of movable wedge-shaped flyweights. As the hub revolves these weights fly outwardly and engage the internal rims of the outer case, binding the hub and shell into a functionally solid pulley or coupling. Working equally well in either direction (hence being reversible), the unit is set to engage or release at a given speed and to slip in case of overload. These clutches are built in all sizes from $\frac{1}{2}$ to 500 hp. for both built-in and general application.

# For The Man Who Insists on Dependable SAMPLES

He will find the answer to his problem in the GEARY-JENNINGS Sampler—a machine that handles wet or dry materials with equal constancy and uniformity—and is therefore as applicable to coal and other non-metallic products as it is to chemical materials. Helps you guard against waste and maintain uniformity of preparation. Adjustable to amount and frequency of sampling. Can be specially designed to meet the needs of any plant.

## GEARY-JENNINGS SAMPLER

**Write for Bulletin 411, which describes and illustrates its operation and its remarkable contribution to industry.**

THE GALIGHER COMPANY
48 SOUTH SECOND EAST
SALT LAKE CITY, UTAH

## Norma-Hoffmann Precision Bearings Help Supply

# "THE BREATH of LIFE" for ENGINES AT SUB-STRATOSPHERE HEIGHTS

What his oxygen supply is to the high-altitude flyer, the supercharger is to his engine. Failure of either is fatal. Together, they make possible the high-altitude fighter planes and bombers that are playing so conspicuous a part in today's warfare.

In the use of anti-friction bearings in superchargers, as in so many other aviation applications, NORMA-HOFFMANN pioneered the way. The terrific speeds of supercharger operation —often as high as 60,000 RPM—demand that ULTRA-PRECISION long characteristic of NORMA-HOFFMANN BEARINGS. And today, not only in superchargers but elsewhere at vital points throughout the plane, NORMA-HOFFMANN PRECISION BEARINGS are doing their part in winning air supremacy for the Allied Air Forces in every theatre of war.

"Where the bearings MUST NOT fail"—in engines, control mechanisms, instruments, armament, radio equipment and other aircraft accessories—they are providing that combination of speedability, load capacity and dependability so vital to the unfailing performance of the plane.

"NORMA-HOFFMANN"

**PRECISION BEARINGS**

**BALL, ROLLER AND THRUST**

*Let our engineers work with you.*

**NORMA-HOFFMANN BEARINGS CORP'N, STAMFORD, CONN. . . . FOUNDED 1911**

***"Pioneer Suppliers for 20 Years of Ultra-Precision Bearings for Superchargers"***

**TO WIN THE WAR — *Work — Fight — Buy War Bonds!***

# NO MORE TRAMP IRON

with a

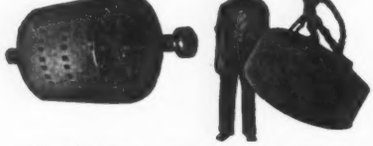
*Stearns*

**MAGNET**

**AUTOMATIC SPOUT TYPE SEPARATOR**

**If you have a "dirty coal" problem as the result of tramp iron and junk, it will pay you to investigate the STEARNS spout magnet shown above.**

**Built for rugged service, gives positive, automatic protection. In all sizes. Write for our Bulletin 97-A.**



Also widely used are STEARNS improved air-cooled powerful Magnetic Pulleys (our Bulletin 302) and Suspended Magnets (Bulletin 25). Tell us about your capacities, plant layouts, etc.

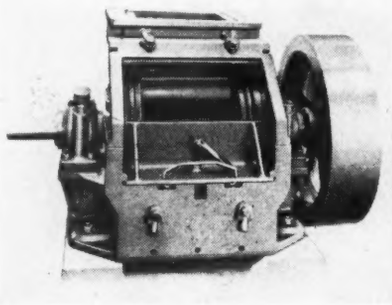
**STEARNS MAGNETIC MANUFACTURING CO.**

**661 S. 28th St., Milwaukee, Wis.**

STEARNS-MAGNETIC MILWAUKEE


## Coal Crusher

Jeffrey Mfg. Co., Columbus, Ohio, offers an 18x12-in. slow-speed "Flexroll" coal crusher for reducing lump coal to stoker size in a single operation. Said to be low in cost and maintenance, this crusher will take lump coal up to 10-in. Recommended especially for small mines with limited capacity and for retail yards, it crushes with three rolls mounted between



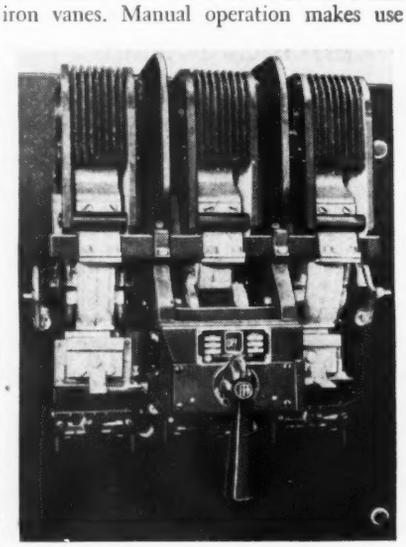
two revolving disks keyed to the large-diameter shaft. The three rolls are free to turn and are held in their outer or crushing position by centrifugal force, yet are free to retract when metal or other foreign material enters the crusher. The rounded surface of the rushing roll is said to make a product with a minimum of fines.

•

## Air Circuit Breaker

A new trip-free air circuit breaker, known as Type KC, with an interrupting rating of 50,000 r.m.s. amp., is offered by the I-T-E Circuit Breaker Co., Philadelphia, Pa. Ratings are 600 volts a.c. and 250 volts d.c., 100 to 1,600 amp. Operation may be either manual or electric; one-, two- and three-pole styles are offered. Mounting may be on open-type (live-front) or dead-front switchboard or in individual steel enclosures of general-purpose or weatherproof construction.

Construction features include silver-alloy main contacts brazed to solid-copper contact blocks, auxiliary and arcing contacts which also are made of silver-alloy and magnetic arc chutes with blowout coils and iron vanes. Manual operation makes use




# POSITIVE PROTECTION

*against*

★ FLAME
★ FUNGI
★ LEAKAGE
★ SHRINKAGE

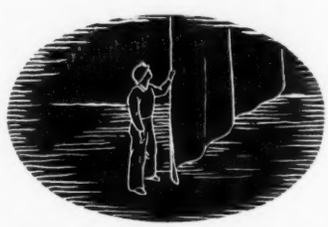
# ABc BRATTICE CLOTH

In wide use ABC Brattice Cloth has demonstrated its ability to dependably resist flame and fungi, . . . under the most severe conditions!

ABC Brattice Cloth is woven from heavy yarns, loomed skillfully and uniformly throughout . . . resists leakage and shrinkage even in a very wet mine.

**OUR LARGE FACTORY STOCKS ENABLE US TO INSURE PROMPT DELIVERIES**

*Write . . . complete details are available on request.*



*American* BRATTICE CLOTH CORPORATION
WARSAW, INDIANA
*Agencies in all Mining Centers*

# "There's NO ABSENTEEISM

## of Cutters, Loaders or Locomotives since we wired them with . . .

# ROCKBESTOS A.V.C. MINING CABLE"

Operator, super, chief electrician—they all agree that there's no cutter, loader or locomotive absenteeism due to internal cable failures when this equipment is wired with Rockbestos A.V.C. Mining Cable. Its tough *permanent insulation* stands up under conductor-heating overloads, and won't ignite, burn or carry flame. And it won't dry out, bake brittle, crack, bloom, swell, flow or rot, because it is highly resistant to heat, vibration, moisture, oil, grease and alkalies as explained in the construction detail to the right.

Keep your equipment out of the shops and up at the face. Use Rockbestos A.V.C. Mining Cable for coil and motor leads, and connections between controllers and resistors. Write for a sample and literature.

**ROCKBESTOS PRODUCTS CORPORATION**
**P.O. Box 1102, New Haven 4, Conn.**

### THE ROCKBESTOS A.V.C. CONSTRUCTION THAT ASSURES LONG-LIVED PERFORMANCE *

1. Heatproof, fireproof asbestos braid, resistant to moisture, oil, grease and alkalies, is diametered to properly fit bushings.
2. Outer felted asbestos wall impregnated with heat, flame and moisture resistant compounds serves as an effective heat-barrier against high ambient temperatures.
3. Varnished cambric for high dielectric strength and added moisture resistance, protected from heat, flame and oxidation by two felted asbestos walls.
4. Heatproof impregnated felted asbestos is unaffected by conductor-heating overloads and won't burn even when exposed to copper-melting arcs.
5. Paper separator makes stripping easy; prevents insulation from sticking to conductor.
6. Flexible tinned copper conductor, perfectly and permanently centered in helically applied insulation.

For sizes and diameters refer to McGraw-Hill Coal Mining Catalogs or write to Rockbestos Products Corporation, P. O. Box 1102, New Haven, Connecticut.

**One of 122 different wires and cables developed for severe operating conditions by Rockbestos.*

# ROCKBESTOS A.V.C.

## The Cable with the Permanent Insulation

**ORDER FROM THESE JOBBERS—SPECIFY "ROCKBESTOS A.V.C."**

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| BECKLEY, W. VA.: | Beckley Mach. & Elec. Co. | EVANSVILLE, IND.: | Evansville Elec.& Mfg. Co. | MIDDLESBORO, KY.: | Rogan & Rogan Co. |
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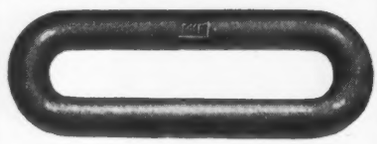
**FOR VICTORY—GET OUT COAL and INVEST IN U. S. WAR BONDS**

FOR SAFETY'S SAKE, SUPERIOR COUPLINGS



Drop Forged Links

Drop forged for strength, Superior Swivel and Single Link Couplings are built to stand the gaff. No welds to let go with resulting wrecks. Superior Couplings on your mine cars will prevent accidents and reduce haulage costs. Order Superior Couplings for your replacements and specify them on new equipment.

DROP FORGED SWIVEL COUPLINGS

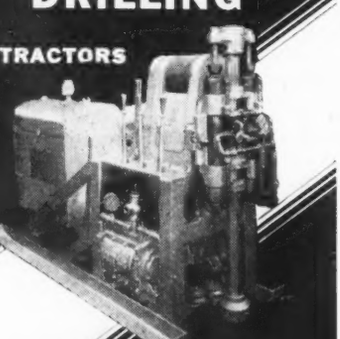
PITTSBURGH KNIFE & FORGE CO.

716 Chateau Street

N. S., Pittsburgh, Pa.

MOTT DIAMOND CORE DRILLING

CONTRACTORS



Mott Type "A" Oil Hydraulic 1500 Ft. Cap., 2¾" Diameter Core.

● Coal and all mineral properties tested—using our light gasoline drills. They save fuel and moving costs . . . guarantee satisfactory and proper cores.

Pre-pressure grouting for mine shafts. ground solidification for wet mine areas by our stop grout method. Water wells and discharge holes drilled and grouted . . . electric drills for inside mine drilling.

MOTT CORE DRILLING CO.

HUNTINGTON • WEST VIRGINIA

of a large pistol-grip handle which requires turning only 90 deg. to open or close the breaker. Electrically operated breakers are provided with a unit-type solenoid mechanism and a trip-free closing relay. Complete description is given in Bulletin 1301.

•

## Identification Coating

To expedite the winding of electrical equipment, Sterling Varnish Co., Haysville, Pa., offers S-184 identifiers, a group of colored identification coatings for tracer-wire applications. The identifier can be applied by running the wire through the varnish or by dipping the entire coil of wire in it. It is said to give a smooth finish and to dry exceedingly fast, permitting handling in less than a minute after application. These identification coatings can be had in any color.

•

## Locomotive Journal

Ease of accessibility and maintenance are features claimed for a new mine-locomotive journal box and bearing design worked out by the Westinghouse Electric & Mfg. Co. and Whitcomb engineers. Points of importance stressed by the engineers are:

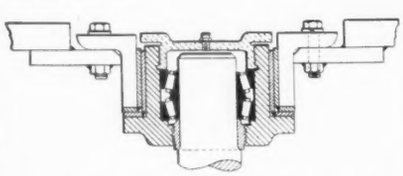
1. The back of the box at the axle fit is equipped with a steel labyrinth which effectively excludes extraneous matter and retains the lubricant within the box.

2. The anti-friction bearing is of the double-row roller type amply designed for the size of locomotive to which it is applied.

3. The journal-box cover is of the screw type which makes bearing adjustments very simple. The inside circumference of the cover bears on the outer bearing race. Any necessary adjustment is made by turning the cover. The cover can then be locked in the proper position by means of a notched device on the outside.

4. The bearing is lubricated by means of a grease fitting in the cover. The cover is recessed so that the outer edges protect the fitting.

5. The journal box is equipped with renewable wearing plates. These plates take the wear and indefinitely extend the life of the box.



6. The sketch, it is stated, shows the ease with which the complete journal box may be removed from the axle without dropping the truck. The pedestal jaws, which are equipped with renewable wearing plates, are bolted to a side-frame extension. Removal of the pedestal jaws provides ample space for pulling the box.

This construction, it is stated, will appeal to the operator who appreciates the importance of good design, quick inspection, low maintenance and long life. New Westinghouse mining locomotives utilize the new journal box and bearing.

CALL YOUR DISTRIBUTOR

Mill Supply Distributors are specialists in keeping our war plants supplied with the necessary tools and equipment to help them in turning their wheels for All-Out Production.

They will always be ready to show you the advantages of Coffing Hoisting equipment.

Illustrated in Model AG "Safety-Pull" Ratchet Lever Hoist.

*Write today for Catalog G-6*

COFFING HOIST CO.

*Manufacturers of*

Ratchet Lever, Spur Geared, Electric and Differential Hoists

Trolleys

Utility Maintenance Tools

DANVILLE, ILLINOIS

BUILDERS Toledo Chronoflo

CONVEYOR WEIGH METERS

Dependable equipment for *accurately* weighing and/or blending coal *while in transit* on conveyor belts. Write to Builders-Providence, Inc. (Division of Builders Iron Foundry), 9 Codding St., Providence, 1, R. I., for Bulletin 322.

*Sincerely Yours,*

BUILDERS — PROVIDENCE

# Helping *everyday* to get the MOST out of M-G Sets and Rotary Converters

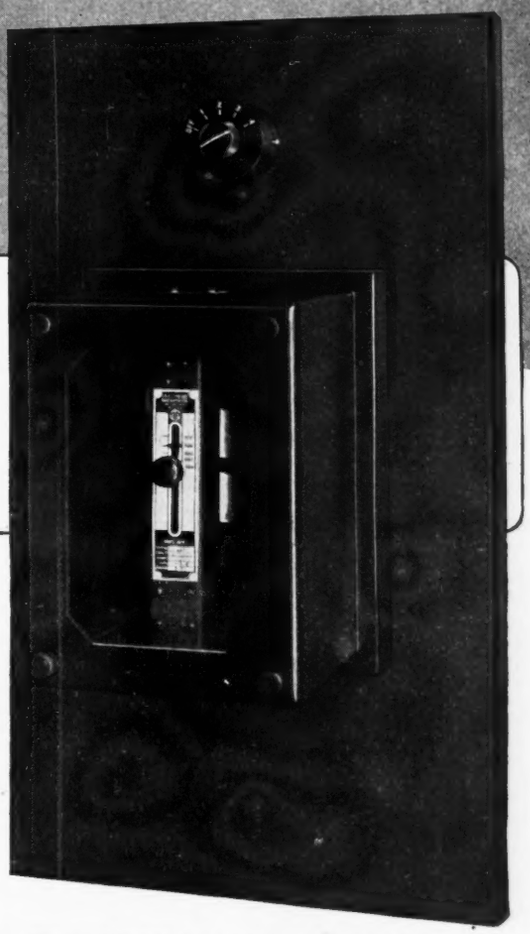
**The I-T-E Load Distributor in many mines is helping to produce more coal by—**

1. **Limiting overload peaks**
2. **Balancing substation loads**
3. **Reducing circuit breaker outages**
4. **Lessening commutator and brush burning**

I-T-E Load Distributors were already in service in many mechanized mines when the need for war-time peaks of coal-production arose. They had been developed to balance loads between motor-generator sets or rotary converters operating in parallel in the same trolley or feeder system, and war conditions gave them opportunity to show how they could help by getting the most out of existing equipment.

What they do is reduce voltage at one station whenever a peak swing beyond a pre-selected value is encountered. Part of the excessive load is automatically transferred to other more lightly loaded substations in the system. Just as soon as the current is reduced to a normal amount, nominal voltage is restored. Damage to commutators and brush rigging is avoided and operating continuity greatly improved.

Time during which voltage is reduced is usually very short and recovery of load is ordinarily very rapid. In most instances, reduced voltage is not noticed outside the affected substation.



*The Load Distributor comes mounted on a 16-inch wide by 28-inch high panel and can be installed quickly in the positive circuit. A glass paneled, dust-proof cover protects the mechanism.*

The Load Distributor is doing its work well. It is a simple device, easily adjusted for specific conditions. It can be used to advantage as a load-limiting device with a single M-G set or converter even though loads cannot be shifted to other stations. It is readily installed.

I-T-E AIR SWITCHGEAR
IMMERSED IN AIR • ENCASED IN STEEL

I-T-E CIRCUIT BREAKER CO., PHILADELPHIA 30, PA.

QUALITY MARLO PACKING

METALLIC & SEMI-METALLIC
**PACKING**
for
**MINE PUMPS**

*"The Packing that gets the Repeat Orders"*

For deep mine pumps. Resists acid mine waters. Keeps grit out of stuffing box. Three types.

• **MARLO ALL PURPOSE METALLIC PACKING**

Best ever devised. Will not freeze at 70° below. Soft, pliant, like fibrous types, yet easier to handle. Won't cut, score or corrode moving parts.

• **"TWIN-TWIST" SEMI-METALLIC PACKING**

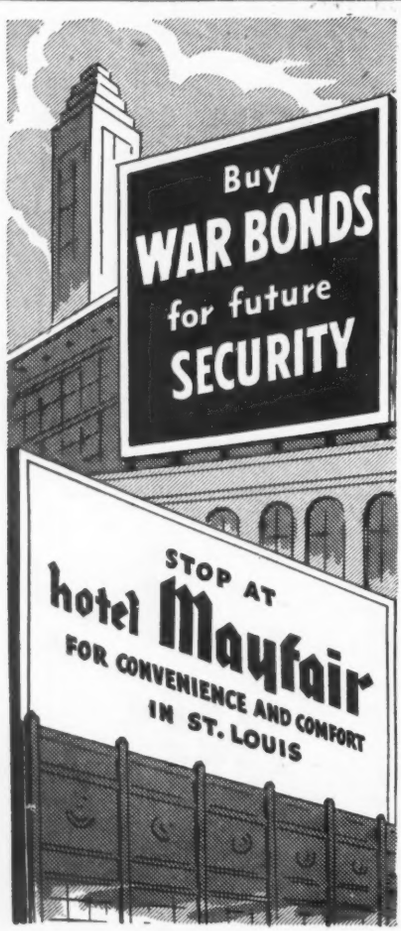
Metal strands twisted with asbestos. Anti-frictional. Durable. Economical. Remarkable compressability. Never hardens. For temperature up to 550° F.

• **"RED WATER" SEMI-METALLIC PACKING**

Most modern development for all hydraulic applications. A solid-packing vegetable fibre combined with metal strands. Retains form under any conditions.

*Let us serve you!*

**THE MARLO COMPANY**
38 HOWARD ST.
NEW YORK, N. Y., U. S. A.




## Conveyor Belt

Goodyear Tire & Rubber Co., Akron, Ohio, has developed a new synthetic rubber conveyor belt said to be comparable in all respects with pre-war high-quality conveyor belts. In addition to comparing favorably in flex lift, aging and resistance to abrasion and cutting, according to W. C. Winings, manager of the company's mechanical goods division, the new belt has the advantages of resisting oil and high temperatures.

Designated "Style SS" type, the new belt is recommended for all mining operations, including coal, metals and similar materials, and for the transportation of gravel and aggregate of all kinds.

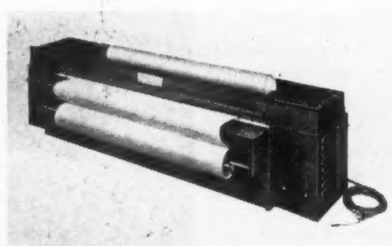
After more than a year's research and development work Goodyear has converted a major portion of its line of industrial rubber goods to synthetic rubber, including transmission, conveyor and elevator belts; hose, V-belts, rolls of all kinds, molded products and similar materials.

•

## Continuous Printers

Two table-type continuous printers have been developed by Peck & Harvey, Chicago. According to the manufacturer, these B-1 and B-2 models produce clear, sharp blueprints or direct-process black and white prints up to 44 in. wide in any lengths at a speed up to 42 in. per minute and a cost of 1 to 1½c. per square foot, including labor.

The printers are said to be compact, easily portable (can be placed on any convenient table or bench), simple and



easy to operate and maintain, and are sturdy and highly efficient. No special wiring is required—simply plug into any standard electric outlet.

The Model B-1, single-tube printer is priced at $260, Model B-2 two-tube printer, $325. Both carry a 30-day money-back guarantee. Over-all dimensions are 16 in. wide by 16 in. high by 63 in. long, finished in durable olive-green wrinkle-baked enamel.

•

## Induction Motor

Fairbanks-Morse & Co., Chicago, offers a new-type all-purpose continuous duty polyphase squirrel-cage induction motor for use in all kinds of industry. According to the company, it is "protectioneered" and embodies many special and vital features.

Constructed with the centrifugally-cast F-M copperspun rotor, this new motor is said to be fully protected against flying

**A NEW VERSION OF AN OLD TYPE**

**"PENNSYLVANIA" TYPE "K" SINGLE ROLL COAL CRUSHER**

**With this advanced design, in rugged STEELBUILT construction, far more accurate sizing is possible to meet Code requirements through quick adjustability, in a range from ¾" to 8".**

**Further—real protection is provided by improved Safety Toggle Equipment, which quickly passes Tramp Iron, and instantly returns Breakerplate to crushing position.**

**Seven (7) sizes afford a capacity range from 50 to 1000 tons per hour.**

*Send for Bulletin No. 2006.*

*Also,—* **"PENNSYLVANIA" BRADFORD BREAKERS, BRADMILLS, GRANULATORS, HAMMERMILLS**

PUT YOUR COAL PREPARATION PROBLEMS UP TO US.

PENNSYLVANIA CRUSHER COMPANY

Liberty Trust Bldg. Philadelphia
*Representatives in Principal Centers.*

MARKETS *are increasing for* STOKER COAL
Eagle

**STOKER COAL CRUSHER**

• Will prepare you to supply the fast-moving stoker sizes—install one or more of these small crushers depending on your demand. Capacity 18-25 tons per hour—rolls adjustable for crushing to ¾" or ⅜"—5 h.p. to operate—rugged construction — low upkeep — prompt delivery — cost only $250. Write for more complete information.

Eagle IRON WORKS
DES MOINES, IOWA
Established 1872

# UP YOUR TONNAGE...GET BETTER BREAKAGE

## WITH THE RIGHT HERCULES PERMISSIBLE

### Hercules FAST Permissibles

There are two types of Hercules Permissibles with a high rate of detonation—Collier C and Red H B. Wherever a smashing effect is desired, the Red H B is best suited. Where easier shooting is encountered, the higher count Collier C is oftentimes more economical.

| EXPLOSIVE | Approximate No. of 1¼" x 8" cartridges per 100 pounds |
|---|---|
| Collier C* | 320 |
| Red H* B | 280 |

### Hercules SLOW Permissibles

There are six Hercules Slow Permissibles, representing a wide range of cartridge strength and count, that are specially suited for coarse coal production. In cases where high cartridge strength is required the three Red H permissibles are suggested. The three Hercoals are widely used for coal that is more easily broken. In many applications Hercoals are replacing black powder and are giving highly satisfactory results.

| EXPLOSIVE | Approximate No. of 1¼" x 8" cartridges per 100 pounds |
|---|---|
| Hercoal* F-1 | 500 |
| Hercoal* D | 450 |
| Hercoal* C-1 | 400 |
| Red H* F | 356 |
| Red H* D | 316 |
| Red H* C | 276 |

### Hercules GELATIN AND SEMI-GELATIN Permissibles

Both Hercogel A and Hercogel 2 are designed primarily for use under severe water conditions. Hercogel A offers the highest water resistance possible in a permissible explosive. Hercogel 2 is a semi-gelatin permissible that is more economical and perfectly satisfactory for most ordinary water conditions.

| EXPLOSIVE | Approximate No. of 1¼" x 8" cartridges per 100 pounds |
|---|---|
| Hercogel* A (Gelatin) | 200 |
| Hercogel* 2 (Semi-gelatin) | 240 |

*Reg. U. S Pat. Off.

EXPLOSIVES DEPARTMENT

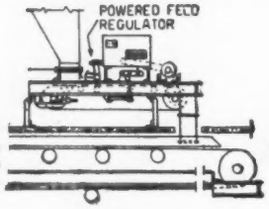
**HERCULES POWDER COMPANY**

INCORPORATED

936 KING STREET, WILMINGTON, DELAWARE

B-42

MERRICK




FEEDOWEIGHT

*Accurately Feeds and Records by Weight*

**Look into this method of feeding coal to a mixing conveyor.**

**A powered feed regulator controls the feed gate. A visible balance indicator shows true balance for correct rate of feed, while the weight totalizer keeps an accurate record of the day's tonnage.**

**Investigate this sturdy, dependable equipment for controlling and recording by *weight*.**

***Write for Bulletin 551.***

**Merrick Scale Mfg. Co.**

**Passaic, N. J.**

HERCULES AUGERS

**Hercules Augers**

Ideal for modern high speed electric drills—withstands whips and torsional strains. Flint hard and tough as whalebone. Drills faster—drills more holes with resharpening—outlasts four to five ordinary drills. Recommended for the hardest jobs. Up to 3" diameters—up to 16 ft. in length.

**Black Diamond Augers**

Carefully made from high-carbon crucible grade steel—heat-treated to obtain as much hardness and toughness as possible, to prevent broken tangs and points. Furnished up to 2" diameters—maximum over-all lengths 16 ft.

**Standard Augers**

Originally developed for use with hand drills. These augers work best at hand drilling drilling holes under stumps, and ditch blasting. Up to 2" diameters from oval steel 7/16" thick, and maximum length of ten ft.

Call on us for any type auger you may require in your operations. We specialize in manufacturing the better grade alloy, heat-treated augers. Write, wire or phone for details concerning sizes, prices, deliveries, etc.

SALEM TOOL COMPANY

SALEM OHIO

chips, falling particles, dripping liquids and other industrial motor hazards. The ball bearings sealed in cartridge-type housings minimize expensive shutdowns due to bearing failures. Cross-flow ventilation is obtained through protected inlets and exhausts at each end of the motor, resulting in uniform cooling and elimination of hot spots.

Regardless of the position of the motor, complete safety for the operator is stated to be assured because there are no moving external parts. The frame is cast in one piece with rib sections to give added strength without increase in weight.

•

## TRADE LITERATURE

OPTICAL EQUIPMENT—American Optical Co., Southbridge, Mass., has four items for safety promotion: posters on importance of wearing goggles; newspaper, "Safety Clipper", containing material on eye safety; analyses of plant hazards; a 16-mm sound film, "Right on the Nose" on safety goggles. The information in the last is also available in booklet form.

HEAT ENCLOSURE—Bulletin 431 describes sectionally-supported upper side walls for bent-tube boilers, made by Geo. P. Reintjes Co., Kansas City, Mo. Construction method is said to contribute to economical use of fuel.

SYNTHETIC RUBBER—"Facts About Synthetic Rubber" is published by the New York Belting and Packing Co., 1 Market Street, Passaic, N. J. Discusses 17 topics on manufacture and uses of synthetic rubber and traces its history.

STAINLESS STEEL—Jessop Steel Co., Washington, Pa., catalog on Jessop stainless-clad steel discusses analyses, applications, manufacture, fabrication, styles of heads and standard size of sheets and plates. Also explains assembly method and contains sections on deep drawing, grinding, polishing, cleaning, gas-cutting, riveting, soldering, welding, etc.

SPEED REDUCER — Stephens-Adamson Mfg. Co., Aurora, Ill. Catalog 643 contains complete information on the Saco speed reducer (double and single reduction types) with pictures and engineering data.

VARIABLE SPEED CONTROL UNITS—Reeves Pulley Co., Columbus, Ind. Catalog G-435 completely describes all Reeves variable speed control units—the transmission, the Vari-Speed motor pulley and the Motodrive—and contains many specific examples, illustrations, revised dimension diagrams and engineering tables. It shows how variable speed control can be applied to all types of production machines to step up output and improve processing. Complete details are given on recent additions and improvements to Reeves products, including the new reducer-type transmission, which provides speed variation and reduction in one compact unit; the Vari-Speed Jr., which furnishes accurate speed control on light machinery; and the improved differential unit. Also there is latest information on new automatic controls and on the Reeves Speedial handwheel.

STEEL AND STEEL PRODUCTS—United States Steel Supply Co. (formerly Scully Steel Products Co.), Chicago. Stock list and Reference Book No. 1 lists stocks of steel, steel products, tools, equipment and machinery handled, including a multiplicity of items from "abrasion-resisting sheets and plates" to "zees."

BALL BEARINGS—New departure Division of General Motors Corp., Bristol, Conn. Booklet WW, profusely illustrated with the various types of ball bearings used in aircraft, tanks, trucks, ships, etc., gives a quick picture of the importance of ball bearings in highly mechanized warfare. The booklet also illustrates New Departure's many "famous firsts," such as the first bicycle coaster brake, the Yellow taxicab, the Rockwell hardness tester, automobile engines with cylinders cast *en bloc*, and bearings with their own oil-circulating system.

LUBRICATION—Valvoline Oil Co., Cincinnati, Ohio. Calendar wall chart, embodying some 260 up-to-the-minute changes, give crankcase recommendations for passenger cars, trucks and tractors, 1936-1943.

GEARMOTORS—Falk Corp., Milwaukee, Wis. Motoreducer Bulletin No. 3100, set up in conformance with standard practice of the American Gear Manufacturers' Association, which allows for three distinct classes of units dependent upon various service factors, gives methods of selection, selection tables and complete dimensions for every size and type of unit.

CAST STEEL PRODUCTS—Farrell-Cheek Steel Co., Sandusky, Ohio. Booklet deals with circular parts, including crane wheels, industrial car wheels, traction wheels, chain rollers, idler rollers, standard flanges, blank gears and pinions, as well as other kindred shapes.

RUBBER PRODUCTS—Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J. Catalog describes hundreds of mechanical rubber products and many other special items, many only for postwar use. Particular emphasis is given belts, hose, molded goods, packing, lathe cut and extruded rubber goods, friction material, rubber covering and abrasive wheels. There also is a brief history of the company and special sections devoted to the three fundamentals of Manhattan and Condor products: "Flexlastics," "Strength Members" and "Manufacture and Design." Engineering data on belting and hose and technical information on other products is included.

ELECTRIC DRILLS—Catalog No. 901, 2nd edition, by the Chicago Pneumatic Tool Co., New York City, gives the details of its line of post mounted electric drills, including data on mountings, specifications, clutch assemblies, post assemblies, boot assemblies for posts, thread bars and safety sockets, boxing assemblies, augers, cable reels and the "Little Giant" hand held electric drills.

LUBRICANTS—E. F. Houghton & Co., Philadelphia 33, Pa., has available a wall type "Lubricant Application Chart" giving data on lubricants for hydraulic systems, spindles, air compressors, reduction gears, electric motors and general plant lubrication, as well as high temperature oils for various applications.

# HARDSOCG

## IS INDELIBLE AS AN IMPORTANT NAME IN THE MINING INDUSTRY

SIXTY THREE years of producing tested methods for these important drilling operations have earned recognition for HARDSOCG that grows as more of this company's products are placed in service.

We, as an organization, have always endeavored to advance the design of our products as fast as modern engineering, influenced by new mining needs, could produce. In short, we have worked close to the "seat of action" so that at no time would drilling requirements be left wanting.

With the advent of World War II, companies whose names are representative of mining throughout the country found HARDSOCG drilling equipment capable in the crisis that demanded more speed and greater dependability.

So it is today, as yesterday, when HARDSOCG equipment is purchased—an investment is made in security of results and there naturally follows that economy in production that is so important at any time.

HARDSOCG manufactures Vertical and Horizontal Electric and Gasoline Driven Drilling Machines for Coal Stripping Operations, Conveyor Type Augers and Cutter Heads, Drill Bits, Electric Coal Drill Feed Bars and Boxings, Ball Bearing Differentials, Caterpillar Jack Shafts, and Heat Treated Alloy Steel Gathering Arm Points for Loading Machines, Coal Miners' Tools and Supplies.

## HARDSOCG MANUFACTURING CO.

*Manufacturers of*

**POWER DRIVEN ROTARY DRILLING EQUIPMENT . . MINERS TOOLS & SUPPLIES**

**OTTUMWA** *Since 1879* **IOWA**

## Obituary

JOHN KNOX LANSDOWNE, 65, who until his retirement in 1941 was vice president in charge of sales of Weir-Kilby Corp., Cincinnati, Ohio, died November 6 at Jewish Hospital. Mr. Lansdowne had been with the corporation for more than 30 years. He was a graduate of Miami University. His brother, the late Commander Zachary Lansdowne, U.S.N., perished in the crash of the dirigible Shenandoah in 1925. Mr. Lansdowne was born in Greenville, Ohio, and before his work with Weir-Kilby, was employed by the Kansas City Southern Railway and the Illinois Steel Corp.

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## Industrial Notes

LINK-BELT Co., Chicago, announces that Edward J. Burnell, heretofore vice president and general manager in charge of Pershing Road (Chicago) plant operations and central division sales, has been transferred to the company's executive office as vice president in charge of sales for the entire company. Directly assisting him in his new post will be Nelson L. Davis, sales manager for materials handling machinery; William H. Kinkead, sales manager for power-transmission machinery, and C. Walter Spalding, sales manager for power transmission equipment required by original-equipment manufacturers and duplicate machinery accounts. Harold L. Hoefman, manager of the company's Atlanta plant, succeeds Mr. Burnell as manager of the Pershing Road plant. Richard B. Holmes, district manager at Indianapolis, becomes manager of the Atlanta plant. David E. Davidson, district manager at Detroit, has been named district manager at Indianapolis. Link-Belt has purchased the manufacturing plant and inventory of Link-Belt Supply Co. in Minneapolis, Minn., and has appointed Ray S. Wood as plant manager.

JENKINS BROS., manufacturer of valves, has appointed J. Murray Whitworth to the Pittsburgh area as a sales representative. He succeeds John J. Simpson, who resigned to become general sales manager of Pittsburgh Gage & Supply Co. Mr. Whitworth, a graduate of Rhode Island State college, has been connected with the company's Philadelphia office for the last seven years as a representative in Baltimore and Harrisburg, Pa. In Pittsburgh he will be associated with L. V. McCune, Jenkins representative there for over 30 years.

AMERICAN BRAKE SHOE Co. has appointed Joseph B. Terbell as first vice-president of its American Manganese Steel Division, Chicago.

GOULD STORAGE BATTERY CORP., Depew, N. Y., has appointed W. H. Radeke as service manager. He has been a Gould service engineer in the Chicago area for the last seven years. For 17 years prior to that he was active in the public-utility field, specializing in lead-acid storage-battery service.

STORAGE BATTERY DIVISION of Philco Corp., Trenton, N. J., has been awarded a second star to add to its Army-Navy "E" flag.

ELECTRIC STORAGE BATTERY Co., Philadelphia, Pa., has received a third star for its Army-Navy "E" pennant.

B. F. GOODRICH Co., Akron, Ohio, has named Chester F. Conner as assistant general manager, and Fred Lang as merchandise manager of its industrial products sales division. Mr. Conner had previously been merchandise manager, and Mr. Lang manager of sole and heel sales.

B. F. GOODRICH Co. has announced the appointment of Charles H. Kanavel as manager of the track and war products department of its national sales and service division. Mr. Kanavel succeeds E. F. Tomlinson, who becomes general manager of the industrial products sales division. A graduate of Purdue University, Mr. Kanavel has been with the company since 1933.

AMERICAN CAR & FOUNDRY Co. has appointed William L. Stancliffe as vice-president in charge of sales to succeed the late William E. Hedgcock. Mr. Stancliffe will continue to handle the company's contractual relations with the government on munitions. Mr. Stancliffe joined the company in 1926.

ROSS-TACONY CRUCIBLE Co., Tacony, Pa., has announced the appointment of Fred L. Wolf as executive vice-president. He was connected with WPB as deputy director of the mica-graphite division, minerals bureau, resigning last month. Prior to that he was associated for many years with the Ohio Brass Company, Mansfield, Ohio, as technical director in charge of laboratories, research and plant control.

WICKWIRE SPENCER STEEL Co., New York, has announced the appointment of Robert T. Dunlap as assistant to the president. Before coming to Wickwire, Mr. Dunlap was associated with Vulcan Iron Works, Wilkes-Barre, Pa.; the Elliott Co., Jeanette, Pa.; Jones & Laughlin Steel Co., Pittsburgh; and Pittsburgh Bridge & Iron Works. He will be stationed in New York.

WESTERN MACHINERY Co., San Francisco, Calif., announces that Bob Bailey, metallurgical engineer, will take over the Wemco line in the Middle West. Charles Skinner, formerly in charge of this territory, is returning to San Francisco.

INDEPENDENT PNEUMATIC TOOL Co., Aurora and Chicago, Ill., announces the award of a second Army-Navy "E" star to its employees.

YALE & TOWNE MFG. Co.'s Philadelphia Division, producing materials handling machinery, has been awarded the Army-Navy "E" for production.


# PROFESSIONAL SERVICES

Consulting Engineering Examinations
Specialists Geologists Reports
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**ALLEN & GARCIA CO.**
*ENGINEERS AND BUILDERS OF MODERN COAL OPERATION*
Authoritative Valuations and Reports of Mining Properties, Equipment and Operation.
332 S. Michigan Ave., Chicago
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**J. H. FLETCHER**
30 Years
Continuous Consulting Service to Coal Mines
Telephone Harrison 5151
McCormick Building Chicago, Illinois

**GEO. S. BATON & CO.**
*Consulting Engineers*
Valuation, Mine Mechanization and Coal Preparation.
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**T. W. GUY**
COAL PREPARATION
To Yield Maximum Net Returns
Face and Product Studies
Plant Design and Operation
Coal Sampling
Kanawha V. Bldg. Charleston, W. Va.

**EDWARD V. D'INVILLIERS ENGINEERING CO.**
*GEOLOGIST AND MINING ENGINEERS*
Specialist in examination and valuation of bituminous coal properties; investigations of operating conditions, costs and markets; development of mineral resources.
Private records covering 40 years of professional activity in coal fields of United States and Canada.
121 N. Broad St., Philadelphia, Pa.

**C. C. MORFIT & ASSOCIATES**
*Consulting Engineers*
Reports, Valuation, Construction, Operation, Management
11 Broadway, New York 4, N. Y.

**EAVENSON, ALFORD AND AUCHMUTY**
*Mining Engineers*
Coal Operation Consultants
Valuations
Koppers Bldg. Pittsburgh, Pa.

**L. E. YOUNG**
*Consulting Engineer*
MINE MECHANIZATION
MINE MANAGEMENT
Oliver Building—Pittsburgh, Pa.

# EVERY LENGTH OF WIRE ROPE NOW IN SERVICE IS VITAL TO WINNING THE WAR

## Keep yours fit and working for the duration

Wire rope serves constantly on all fronts: in mines and quarries . . . oil-fields and timberlands . . . mills and shipyards . . . at the docks — hoisting, pulling, moving materials for production . . . loading, shipping, delivering fighting tools to our fighting men. And every length in service now must last longer than ever before.

Make your wire rope last . . . by extra care . . . by guarding its life . . . for wire rope is the lifeline to victory. Your regular source of supply is ready to give you helpful information on how to make your wire rope last longer . . . how to get maximum ton-miles of service from your rope in service.

### HOW TO MAKE YOUR WIRE ROPE LAST LONGER

1. Select the right rope for the job *by getting proper construction; right size; right lay; full allowance for safety factor.*
2. Install wire rope properly *by unreeling it correctly; winding on drum properly; not allowing rope to kink; fixing clamps properly; reeving rope through sheaves and blocks carefully; seizing rope-ends thoroughly.*
3. Be diligent in maintenance of your wire rope *by inspecting it regularly and carefully; inspecting sheaves and bearings often and thoroughly; checking lubricant frequently; cleaning rope regularly; avoiding impact or shock loads.*

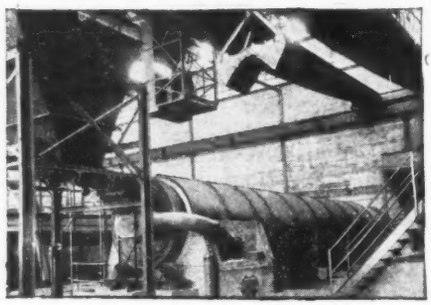
**J&L STEEL**

**JONES & LAUGHLIN STEEL CORPORATION**

WIRE ROPE DIVISION

PITTSBURGH AND MUNCY, PENNSYLVANIA

**Rotary Dryer**
**Retorts**
**Coolers**



These Dryers are ingeniously designed and engineered for the material to be dried, the time in which you wish to dry it, and the ultimate use to which the dried material is to be placed.
But all these facts are interestingly outlined and explained in our Booklet "Factors to Seek and Check in Buying a Rotary Dryer."

*Send for your free copy.*

**L.R. CHRISTIE CO.**

**Headquarters for Drying Equipment**

**17 EAST 42nd STREET**

**NEW YORK 17, N. Y.**

Just as undue wear on auto tires results when the wheels are out of alignment, so unnecessary wear is caused on valve parts when they are not perfectly aligned.

Perfect alignment of all parts of Fairbanks Valve U-01 is assured by the radial seat when valve is taken apart to replace a worn disc. Without sliding or scraping the surfaces of the seat, the radial seat is drawn to a tight joint by a Union nut. This increases the life of the valve and assures a tight body joint after every assembly.

The slide-on disc holder is so guided that it will not bind or stick regardless of position of valve. The design of the disc nut tends to throttle the action against the disc, thereby prolonging its life. Disc rings of any make will fit into the disc holder.

You can "Bank on Fairbanks Valves" for dependable service, long life and low maintenance cost.

Write for catalog No. 42 and name of our nearest distributor.

**THE FAIRBANKS COMPANY**

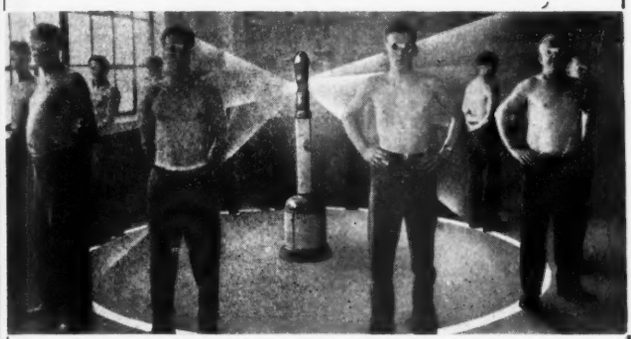
393 Lafayette St., New York 3, N. Y.

Boston, Mass., Pittsburgh, Pa.
Distributors in Principal Cities

**Fairbanks** *Standard and Renewable* **Valves**

# HANOVIA'S
## *ULTRAVIOLET*
# LIGHTHOUSE

*The New Highly Efficient Aid For the Prevention of Absenteeism*



**Hanovia—the world's largest manufacturer of Ultraviolet equipment offers mine operators the new Lighthouse to help workers keep physically fit.**

It is universally recognized that "sunshine" is essential to health and that the most vital elements in it are the "actinic ultraviolet rays"—such as produced by Hanovia's LIGHTHOUSE.

This LIGHTHOUSE has been created for the ultraviolet irradiations of groups of persons. It has been designed to stand upon the floor in the center of an area about twelve feet in diameter. Employees can walk or stand about the lamp at an average distance of five feet. Fifteen persons can be accommodated at one time at five feet distance.

## The ultraviolet application involves only a few minutes

The LIGHTHOUSE is sturdily built, easy and economical to install, maintain and operate.

Many large mines—here and abroad—are using ultraviolet lamps with remarkable results. The experience of the famous Boliden Copper Mines in Sweden is worth noting. Dr. Johan Ponten, an eminent Swedish physician, makes this statement concerning the results obtained from Hanovia Ultraviolet Group Lamps.

> **"The reduction of absences due to illness (not including accidents) amounts to 120 days per annum for each 100 workers. In addition to this, one-day-absences diminished by 12%. In all, these mines gained 134 additional working days from each 100 workers during the year in spite of the fact that figures of absence due to illness had previously shown a general trend towards increase during three years."**

The ultraviolet baths are beneficial to the miners and also the industry itself.

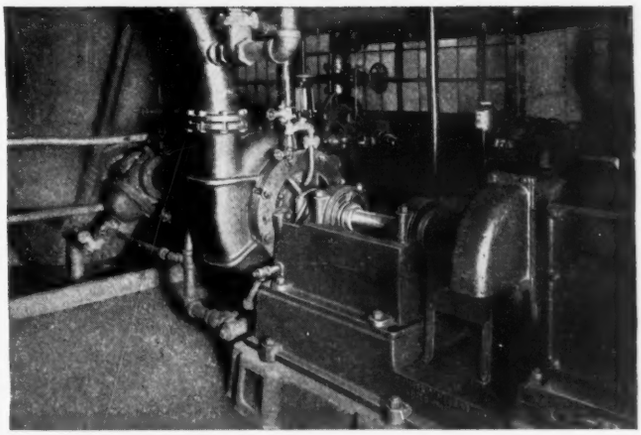
We urge mine operators to investigate Hanovia's Lighthouse

***Send For Free Booklet "Fitness in Industry"***

Address—Industrial Division, Dept. C-2

**HANOVIA CHEM. & MFG. CO.**
**NEWARK, N. J.**

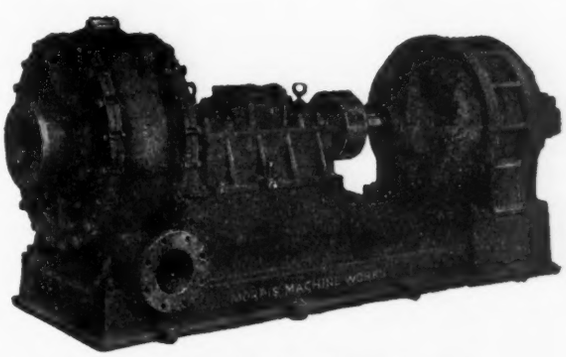
**World's largest makers of Ultraviolet Lamps For the Medical Profession and Industry**



# *Are your pumps free from*
# cavitation?
# confrication?
# caducity?

**CAVITATION . . . eddy currents that reduce hydraulic efficiency; CONFRICATION . . . friction that reduces mechanical efficiency; CADUCITY . . . troubles that accompany old age . . . these weaknesses cause unsatisfactory operation of centrifugal pumps.**

**You can secure freedom from them by using Morris Pumps, because Morris designs are notable for their high overall efficiency, long life and dependable service. The Morris features that secure and maintain thoroughly satisfactory centrifugal pump operation are described in bulletins which will be sent on request.**



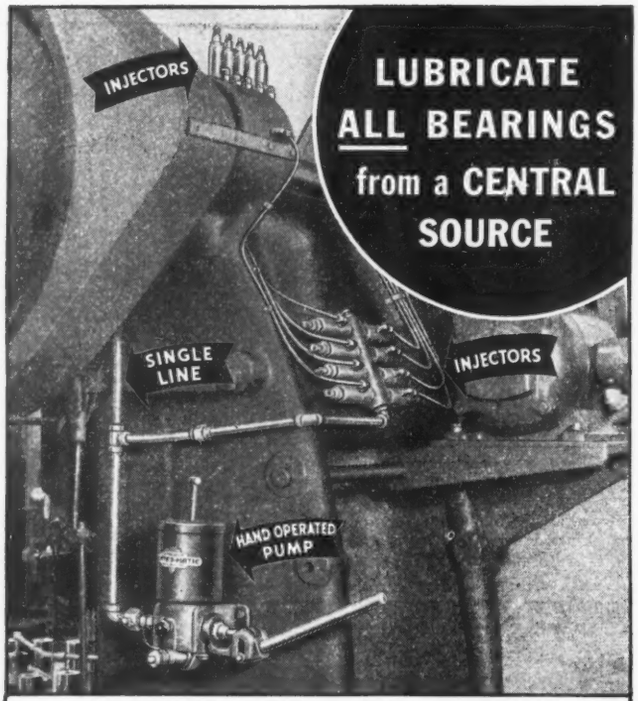
**Morris Heavy Duty Material-Handling Pump**

**MORRIS MACHINE WORKS**
**Baldwinsville, N.Y.**

MORRIS
ESTABLISHED 1864

**Export Office: 50 Church St. New York 7, N. Y.**

**CENTRIFUGAL PUMPS**




**Avoid Bearing Failures... Maintain Production for Victory!**

★

*Equip your machinery with*

# LINCOLN

## CENTRO-MATIC

## LUBRICATING EQUIPMENT

The Lincoln method of lubrication provides a simple, practical means of delivering lubricant to all bearings of a machine, or group of machines, from a central source—without stopping machines.

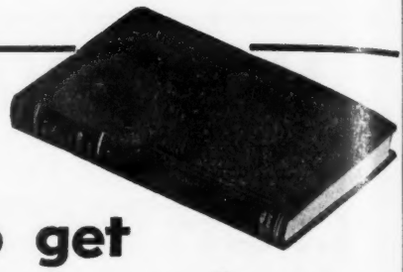
A Centro-Matic System consists of a number of Centro-Matic Injectors—one for each bearing—and a power operated or a hand operated Centro-Matic Pump. A power operated system can be either time clock control or push button control . . . The injectors can be grouped in manifold or located separately at each bearing. In either arrangement only a single lubricant supply line is required . . . Easily installed on new or old machines. Write for details.

**The ARMY-NAVY PRODUCTION AWARD** for high achievement in the production of war equipment, conferred upon the Lincoln Engineering Company has had a star added. This star symbolizes 6 more months of exacting service to our Armed Forces, delivering vital materials so necessary for ultimate Victory.

*FOR VICTORY—BUY U. S. WAR BONDS and STAMPS* 143-45

**LINCOLN ENGINEERING COMPANY**
PIONEER BUILDERS OF LUBRICATING EQUIPMENT
5701 NATURAL BRIDGE AVENUE, ST. LOUIS 20, MO., U. S. A.





# How to get peak coal production

## *from your mechanical-loading equipment*

Here are the most efficient methods of using various types of loading machines, conveyors, scrapers, and certain special equipment, in the loading and handling of coal underground, now presented in a readable, thorough, and practical treatment.

***Just Published***

# Mechanical Loading of Coal Underground

*By* IVAN A. GIVEN

EDITOR-IN-CHARGE, *Coal Age*

**397 pages, 6 x 9, 222 illustrations, $4.00**

THIS practical manual thoroughly discusses the various types of equipment used in slope-sinking, entry-driving and development work, and in production of coal from the usual or regular working sections—details the methods suited to or used with the various types of equipment nd under various seam thicknesses and natural conditions—tells how machines are best installed, where they can fill in for other types of equipment, what to do to get biggest production from equipment.

Included in this sound book are over 200 necessary maps, plans, and sketches, showing how methods described in the text are practically applied to actual working conditions. A liberal number of mining plans tested in given mines throughout the country are here, as well as the latest thought on face preparation, power supply, and maintenance.

### *Tells you:*

—every possible way in which equipment can be used

—how to keep equipment in first-class running order

—what factors to consider in purchasing mechanical-loading equipment

—when a small investment in simple attachments saves the purchase of an entire new machine

—installation considerations for all equipment

—methods for increasing mining extraction etc., etc.

**CONTENTS**

1. Mechanical - Coal - loading Principles
2. Mechanical - Coal - loading Essentials
3. Types of Mechanical-loading Units, Characteristics, Crews, Unit production—Hand-loaded Equipment
4. Types of Mechanical-loading Units, Characteristics, Crews, Unit Production — Self-loading Equipment
5. Slope-sinking and Development with Mechanical-loading Equipment
6. Conveyor-mining Plans
7. Scraper-mining Plans
8. Mobile-loader Mining Plans
9. Face Preparation
10. Power for Mechanical Loading
11. Maintenance in Mechanical Loading

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Send me Given—Mechanical Loading of Coal Underground for 10 days' examination on approval. In 10 days I will send $4.00, plus few cents postage, or return book postpaid. (Postage paid on cash orders.)

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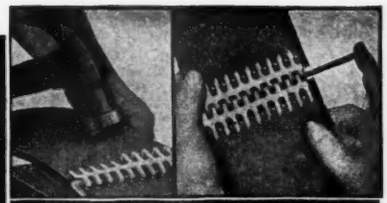

"JUST A HAMMER TO APPLY IT"

# ALLIGATOR

(Trade Mark Reg. U. S. Pat. Office)

## STEEL BELT LACING

World famed in general service for strength and long life. A flexible steel-hinged joint, smooth on both sides. 12 sizes. Made in steel, "Monel Metal" and non-magnetic alloys. Long lengths supplied if needed. Bulletin A-60 gives complete details.

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## BELT FASTENERS AND RIP PLATES

For conveyor and elevator belts of all thicknesses, makes a tight butt joint of great strength and durability. Compresses belt ends between toothed cupped plates. Templates and FLEXCO Clips speed application. 6 sizes. Made in steel, "Monel Metal", non-magnetic and abrasion resisting alloys.

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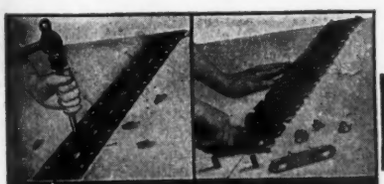
*Sold by supply houses everywhere*



"CONVEYOR BELTS EASILY FASTENED"

**FLEXIBLE STEEL LACING CO.**

4638 Lexington St.
Chicago, Ill.

# HENDRICK

*Carbondale* **1600**

*for*

**PERFORPATED PLATE**

Round—Square—Diagonal—Slot
*Any perforation*

**HENDRICK MANUFACTURING CO.**

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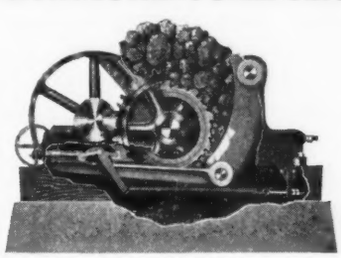
Sales Offices in Principal Cities.
Please Consult Telephone Directory.

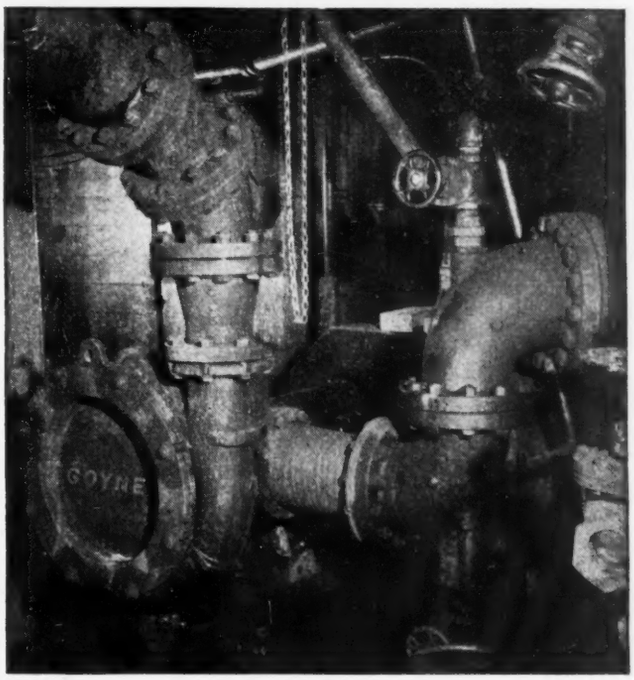
# BLACK DIAMOND COAL CRUSHERS



McLANAHAN BUILDS A TYPE AND SIZE FOR EVERY COAL CRUSHING REQUIREMENT! WRITE FOR DATA.

**McLANAHAN AND STONE CORPORATION**
ESTABLISHED 1835 HOLLIDAYSBURG, PENNA.

# GOYNE PROCESS PUMPS




**A Sand Pump is only a link in a chain in a coal washing plant, but it can be a strong link if it embodies the following features as does the Goyne:**

1. Ease of inspection of all wearing parts. All internal portions are immediately accessible after removing only the rear head of the pump. No suction or discharge piping is disturbed.

2. The one packing box of the pump is subjected only to suction pressure and is readily kept clean by a low pressure clear water line. Long packing and shaft sleeve life is assured.

3. Impeller clearance is adjusted *while the pump is running*, insuring constant pump capacity so essential for uniform washing.

4. There are twenty-eight possible nozzle assembly combinations for each standard pump. Washery designers like this "adaptability feature" as it helps them out of tight places and simplifies piping.

5. We carry the spare parts stock. Order your replacements when needed. Reduce your inventory by using Goyne Process Pumps.

*All inquiries receive prompt and careful attention.*

**THE GOYNE STEAM PUMP CO.**
**ASHLAND, PA.**

## . . . and drive even harder on the pay-roll savings plan!"

Make War Bonds the Christmas Order of the Day. Urge your workers to make their personal Christmas gifts in the form of War Bonds—and practice what you preach! Make this a 100% War Bond Christmas—to insure future Yuletides of peace and prosperity.

Make up your own posters to spread the "War Bonds for Christmas" story across your plant. Tell the story again and again on bulletin boards, in your plant magazine, and on pay envelope stuffers.

But don't forget your basic, all-important Pay-Roll Savings Plan. How's it going, these days? Perhaps it needs a bit of stoking-up right this very minute, to hold its full head of steam against the competitive demands of the holiday season.

*Well, you're the man to stoke it!* You can't expect it to keep running indefinitely on last summer's enthusiasm. See to it that your participation percentages, and your deduction percentages, *both* end up the year at new levels.

Every month, now your Pay-Roll Savings ought to run well ahead of the preceding month. *For so many families that formerly depended on the earnings of a single worker, now enjoy the combined earnings of several.* Such *family* incomes are doubled, trebled, even multiplied many times.

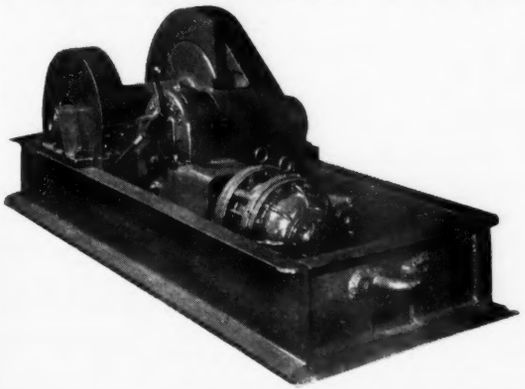
Now's the time to turn as much as possible of these increased earnings into War Bonds—War Bonds for Christmas . . . and War Bonds the whole year 'round!

# GIVE THE PRESENT WITH A FUTURE—WAR BONDS!

This space contributed to Victory by **COAL AGE**

*This advertisement prepared under the auspices of the United States Treasury Department and the War Advertising Council*

## *NEW!* "FLOOD CITY" CAR SPOTTING HOIST



It will pay you to investigate the 6 new features incorporated in the "Flood City" Car Spotting Hoist . . . an entirely new design in which a 30 to 1 worm gear reducer replaces old style cumbersome reduction.

These are the new features: (1) Special Emergency Brake. (2) Any Standard 5 H.P. Motor. (3) Rope pull 6,000 lbs. at 35 ft. per minute. (4) Special Ahlberg Ball Bearings. (5) Sealed-in-oil Reduction Gear Unit. (6) Heavy Channel Iron Frame with turned up ends to facilitate moving.

*WRITE TODAY FOR OUR CATALOG*

**FLOOD CITY BRASS & ELECTRIC CO.**
**JOHNSTOWN, PA.**

simplified
## ARC WELDERS

—to help you solve your production problems if they concern joining of metals.

REMOTE CONTROL an exclusive Hobart feature lets operator adjust machine at his work. Saves time—insures better work. Ask us for catalog and delivery dates.

Hobart Bros. Co., Box CA-123, Troy, Ohio

***Welding for Tomorrow***
A series of design sheets that will help you plan. Initial series free. Ask for them.

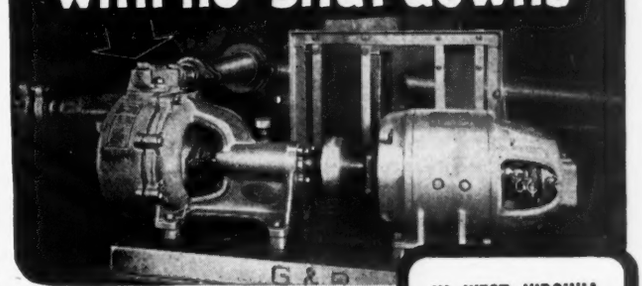
Write for Complete CATALOG

**HOBART**
*"Simplified" ARC WELDERS*
HOBART *"One of the World's Largest Builders of Arc Welders."*

**PERFORATED METAL**
**COAL MINING SCREENS**
***Manufactured exactly to your specifications***
**Any size or style screen, in thickness of steel wanted with any size perforation desired.**
**We can promptly duplicate your present screens at lowest prices.**

**CHICAGO PERFORATING CO.**
2442 West 24th Place
CHICAGO, ILLINOIS
Canal 1459

## it PUMPS 24 hours a day with no "shut downs"



The keynote of the dependable G & R Mine Gathering Pumps is the word "simplicity". Because of greater simplicity (only one moving part — the impeller), these Self-Priming Centrifugals will pump more water, more continuous hours, per dollar invested than any other type. No valves to clog; no cylinder liners to be cut out; no gears, cams, levers, etc., to wear, break, or cause trouble. Pumps operate at motor speed. Capacities up to 220 GPM; heads up to 125 ft. Our engineering department will survey your requirements and make recommendations or write for Bulletin MP-2. It's free.

*See our catalog data in Coal Mining Catalogs*

**IN WEST VIRGINIA**

the Koppers Company are replacing old pumps as they wear out with G & R self-priming centrifugal mine gathering pumps. At the Helen, Stanaford, Kimball, Stotesbury and Kopperstown Mines 36 G & R Pumps of varying capacities are daily proving their simplicity and dependability.

*Distributors in all principal Mining Areas.*

**THE GORMAN-RUPP CO.**
**MANSFIELD, OHIO**

GORMAN & RUPP PUMPS
UNSURPASSED FOR PUMPING FAST

## FLORY HOISTS

Manufacturers of Steam, Electric and Gasoline Hoists of all types; also parts for all model Flory Hoists.

**FLORY MANUFACTURING CO.**
**BANGOR, PENNSYLVANIA**

# SEARCHLIGHT SECTION

**EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RELEASE**

**UNDISPLAYED RATE:**

10 cents a word, minimum charge $2.00. (See ¶ on Box Numbers.)
POSITIONS WANTED (full or part-time individual salaried employment only), ½ the above rates.
PROPOSALS, 50 cents a line an insertion.

**INFORMATION:**

BOX NUMBERS in care of any of our New York, Chicago or San Francisco offices count 10 words additional in undisplayed ads.
DISCOUNT OF 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

**DISPLAYED—RATE PER INCH:**

The advertising rate is $6.30 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.
AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page. C.A.

*NEW ADVERTISEMENTS received by 10 A. M. December 28th, will appear in the January issue subject to limitations of space available.*

## POSITION VACANT

ARMATURE WINDER, for D.C. and A.C. **Permanent. Good opportunity with excellent living shop conditions. State qualifications, age, and availability in letter. Location: Columbus, Ohio. Reply: P-239, Coal Age, 330 W. 42nd St., New York 18, N. Y.**

## FOR SALE

FOR SALE: Sizeable boundary of coal land carrying two workable seams and located in gigantic Tennessee Valley development area. One 48" seam of excellent steam coal. One mine now operating in this seam has 10,000 ton per month contract. This mine included in deal. Other seam will make good stoker as well as high grade steam coal. This seam 34" thick and conditions are ideal for all-conveyor mine. Entire output from both seams can be sold within radius of forty miles. Large tonnage of stoker coal can be delivered from mine by truck. FS-240, Coal Age, 520 N. Michigan Ave., Chicago 11, Ill.

BUCKET ELEVATOR, vertical, 29 feet centers between head and foot shafts with 14"x7"x7" iron buckets on single strand of chain. Capacity 27 tons per hour. Price $600. with countershaft. Green River Mine, South Carrollton, Ky.

**WE LOOK INTO THE EARTH**

By using Diamond Core Drills. We drill for Limestone, Gypsum, Talc, Fire Clay, Coal and all other minerals.

**PENNSYLVANIA DRILLING CO.**
Drilling Contractors
Pittsburgh, Pa.

**DIAMOND CORE DRILLING**, for any mineral. More than sixty gasoline, steam and electric drills, suitable for any job. **OUR SPECIALTY—testing bituminous coal lands.** Satisfactory cores guaranteed. Prices very reasonable.

**HOFFMAN BROS. DRILLING CO.**
PUNXSUTAWNEY, PA. Est. 1902 Tel. 382

**8—Allis Chalmers Speed-Ace**
**TRACTOR WAGONS**
**7½-yd. cap. In good condition**
*Write for illustrated bulletin!*
**IRON & STEEL PRODUCTS, INC.**
**13484 S. Brainard Ave., Chicago 33, Ill.**
***"Anything containing IRON or STEEL"***

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**COAL PROPERTY**

40 acres, half million tons high quality Pittsburgh Coal. Ideal trucking proposition, outcrops on hard-surfaced road 1 mile from B. & O. railroad, 5 miles from Clarksburg. Additional coal acreage of same quality may be obtained.

**J. E. PENDERGAST**
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**COAL STRIP — MINING WANTED**

**In the last three months I have placed sveral contractors on bituminous coal stripping operations—NOW—I have three more capable contracting firms ready for work with responsible coal companies on contracts with post-war possibilities. If you can utilize the services of one of these contractors contact me at once giving me a general idea of the job, the size of the tract, boring records, estimated coal tonnage, zone price, height of the coal, average and maximum depth and character of the overburden, length of truck haul and price you will pay per ton.**

**CHARLES T. BEEBE**
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**TOP GRADE RELAY RAILS**
**QUICK SALES SMALL PROFITS**

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| 6,000 linear feet | 56 lb. per yard |
| 40,000 linear feet | 70 lb. per yard |
| 20,000 linear feet | 80 lb. per yard |
| 40,000 linear feet | 85 lb. per yard |
| 17,000 linear feet | 90 lb. per yard |
| 975 linear feet | 100 lb. per yard |

*Splice Bars to match*

**E. C. SHERWOOD**
**50 Church St., New York (7), N. Y.**
**Telephone: CO 7-3322**

**RAILS and ACCESSORIES**

**RELAYING RAILS**—Super-quality machine-reconditioned—not ordinary Relayers.
**NEW RAILS**, Angle and Splice Bars, Bolts, Nuts, Spikes, Frogs, Switches, Tie Plates, and all other Track Accessories.

*Phone, Write or Wire*

**L. B. FOSTER COMPANY, Inc.**
PITTSBURGH NEW YORK CHICAGO

**RAILS—CARS**

All sections of rails and good serviceable second hand cars, all gauges, also spikes, bolts, frogs, switches and ties.

**M. K. FRANK**
480 Lexington Ave. New York City
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One 400 KW **Crocker Wheeler** 250 volt 150 RPM **Generator** direct connected to a **Skinner Uniflow Engine** with automatic oiling system Falls automatic Engine stop. Good Condition.
One 200 KW **Northern Elec. Co.**, 250 volt **Generator**. 100 RPM direct connected to a **Bates Corliss** 18x42" **Steam Engine**. Bargain for quick sale.
Diesel and Natural Gas Engines, etc.

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Pa 2290. 710 Eastgate, St. Louis 5, Mo.

**Davenport, Porter & Vulcan** steam S/T **locomotives**, 17-20 tons, 36" gauge, (4); rebuilt.
**Plymouth** 25-ton gas **loco.**, std. gauge
**Browning** 25-ton **locomotive crane**, steam.
**Bucyrus** 50B Diesel **dragline**, 70', 2-yd.
**Bucyrus** 50B steam **shovel front**, 2-yd.
**Euclid** 6-yd. bottom dump **crawler wagons** (8).
**Bucyrus-Erie** 1¼-yd. gas-air **crawler shovel.**
**Boiler tubes**, 236—1¾"x5', & **ferrules**; (new).

**H. Y. SMITH CO.**
828 N. Broadway, Milwaukee 2, Wis.

**RELAYING RAILS AND TRACK ACCESSORIES**

**Available at our conveniently located warehouses**

Used Railroad Cars, Car Parts, Locomotives, Pipe and Tubes, Plates and Angles.

*We buy track, railroad equipment and plants.*

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**122 South Michigan Ave., CHICAGO 3, Ill.**
Chicago - St. Louis - San Francisco
Los Angeles - New York - Portland, Oregon

FOR SALE
**STEEL TANKS—STEEL BUILDINGS**
All sizes and kinds
Guaranteed used steel pipe
Valves and fittings
All items at various points
**JOS. GREENSPON'S SON PIPE CORP.**
Natl. Stock Yds., St. Clair Co., Ill.

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**WANT BUY**
**1—6 to 12 Yd. Cap. Stripper Shovel or Walker Dragline.**
**R. C. STANHOPE, INC.**
**60 E. 42nd St. New York, N. Y.**

**Wanted Joy Mine Loaders**

Size 5 BU—7 BU—8 BU—12 BU—14 BU. With AC motors, caterpillar mounted and car wheels adjustable 36" to 42" gauge 150 KW motor generator set.

**J. C. SEALY**
**1004 Salem Avenue, Hillside, New Jersey**

WANTED
**Shovels—¾ to 2½ yards.**
**Draglines—1½ to 6 yards.**
**FRANK SWABB EQUIPMENT COMPANY**
**HAZLETON, PA.**
Telephone 3906

**WANTED**

3 yard Diesel Dragline 80 to 100' boom
2 yard Diesel shovel
½ yard shovel
Bulldozer
3—10 ton dump trucks

**W-238**, Coal Age
520 No. Michigan Ave., Chicago 11, Ill.

# FOR SALE—All Equipment from

# WASSON COAL COMPANY'S No. 2 MINE

CARRIER MILLS
ILLINOIS

• Just purchased the following equipment and offering same for immediate delivery:

1—5-track Steel Tipple, (3) loading booms, shaker screens, conveyors, Viking Oil Treating Apparatus and all necessary appurtenances Capacity 2500-ton per shift.
1—Re-screening plant, (2) 75-ton bins and (1) 85-ton bin, capacity 100-ton per hour. All load on one track, with (2) Symons Double Deck Vibrating Screens.
1—Jeffrey Car Haul, consisting of (2) hauls, 325' long, driven by 75 H.P. motor.

**CONVEYORS**

1—Joy Belt Conveyor, 1000' long, 26" belt, 5-ply, 28 ounce belt. Complete with 20 H.P. DC motor. Head and tail with sectional conveyor frame. Good condition.
2—Joy Elevating Conveyors for loading from conveyors into mine cars.
1—Joy Chain Conveyor with 90' centers, equipped with drive head and foot section.

**JOY LOADING MACHINES**

4—8-BU Joy Loading Machines, purchased new in 1937, actually in use less than a year.

**MINING MACHINES**

5—Goodman 12-AA Shortwall Mining Machines, 50 H.P., 250 Volt DC.
2—Jeffrey 35-BB Shortwall Mining Machines, 50 H.P., 250 volt DC.

**TURBINE**

1—500 KW General Electric, Condensing Curtiss Steam Turbine, 2300 volt AC, 3600 RPM, 80% P.F., complete with switchboards and voltage regulator.

**GENERATORS**

1—200 KW Chuse 4-valve, non-releasing General Electric Engine Generator Set, 250 volt DC.
1—200 KW Ridgway, direct to McEwen Engine.

**COAL DRILLS**

4—Chicago-Pneumatic Coal Drills, #273

**MISCELLANEOUS**

1—Phillips Cross-Over Dump.
4—Hrt 72x18 Butt Strapped Tripple Riveted Boilers, 175# steam pressure, complete with fronts and all appurtenances.
1—8' Jeffrey Centrifugal Fan with 25 H.P. motor.

OTHER ITEMS TOO NUMEROUS TO MENTION

**LOCOMOTIVES**

1—10-ton Goodman, type 34-B, 250 volt ball bearing motors.
4—8-ton Goodman, type 32-A-1-4-C, 250 volt ball bearing motors.
8—6-ton General Electric, HM-801, 250 volt ball bearing motors with CY-21 gathering reels.
1—6-ton General Electric, HM-834, 250 volt ball bearing motors.
2—5-ton General Electric, 803, 250 volt ball bearing motors.

The above locomotives can be inspected at our shop. They have all been completely rebuilt and guaranteed 100% against electrical or mechanical defects.

Frank J. Wolfe

*We specialize in buying complete mines that are going out of business or from receivers in bankruptcy, administrators of estates, etc.*

## COAL MINE EQUIPMENT SALES COMPANY

306-7 BEASLEY BUILDING L.D. Phone-34 TERRE HAUTE, INDIANA

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**FOR SALE**

# 150—COAL HOPPER CARS

50-Ton Twin hopper or side discharge—1,683 and 1,831 cubic feet capacities.

*Suitable for industrial and plant service.*

**IDEAL FOR MOBILE COAL STORAGE**

***Available for prompt delivery***

***WRITE FOR FURTHER DETAILS***

**Request our bulletin describing and illustrating various other kinds of equipment also.**

## IRON & STEEL PRODUCTS, INC.

*38 years' experience*

13484 S. Brainard Ave. Chicago 33, Illinois

*"ANYTHING containing IRON or STEEL"*

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**COAL CUTTING MACHINES**

1—35B Jeffrey 250 volt Shortwall
1—35B Jeffrey 500 volt Shortwall
1—29LE Jeffrey T.O.H. Arcwall Permissible
1—12DA Goodman, 50 HP, 210 volt
1—12A Goodman, 500 volt Shortwall
1—12G3 Goodman AC Shortwall, 3/60/220-440 volt

**LOCOMOTIVES**

1—13 ton G.E. with HM-829 250 V Motors
1—10 ton G.E. with HM-830 250 V Motors
2— 6 ton Jeffrey with MH-88 250 V Motors, and reels
1— 6 ton G.E. with HM-819 250 V Motors

**ELECTRIC MOTORS, ETC.**

1—165 HP G.E. Syn. Motor, 3/60/2200 or 500 V, 900 RPM
1—100 HP Crocker Wheeler Syn. Motor, 3/60/220 V, 1200 RPM
2—50 HP G.E. Slip Ring Motors, 3/60/440 V, 600 RPM
1—100 HP West. Type CW Slip Ring Hoist Motor, 3/60/2200 V. 720 RPM
3—150 KVA Pittsburgh Transformers, 6600-220/440 V
3—100 KVA G.E. Transformers, 13,200/6600/2200-220/440 V
3—30 KVA West. 2200-110/220 V
1—25 HP West. Type HK, 250 V. Series Wound Hoist Motor, 600 RPM

*Send us a list of any equipment you may have for sale.*

**TIPPINS MACHINERY COMPANY**

3530 Forbes St. Pittsburgh, Penna.

---

FOR SALE

**DIESEL ENGINE**

Fairbanks Morse 3 cylinder, 180 H.P., 360 r.p.m., late model—excellent condition. Complete with Woodward governor and 12,000 gal. fuel storage tank.

**Abbott Clay Products Company**
Cambridge, Ohio

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*NEW and REBUILT*
STORAGE BATTERY

**LOCOMOTIVES**

1½ to 10 Ton — 18" to 56" Track Gauge

GREENSBURG MACHINE CO.
Greensburg, Penna.

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**MACHINE TOOLS**

Lathes, Shapers, Milling Machines, Saws etc. for general maintenance work. We have a knowledge of the shop problems of the mine shop. Write or wire us your inquiries.

**Cincinnati Machinery & Supply Co.**
217 E. Second St. Cincinnati, Ohio

# Prompt Shipment From Our Warehouse

### MINING MACHINES

2—12 G3 Goodman 220/3/60 AC 6' bar.
2—12 AB Goodman 250 v. DC 6' bar.
1—35 Jeffrey Low Vein Machine DC Mche. 36" Ga.

### STORAGE BATTERY LOCOMOTIVES

**2—6 Ton G. E., Permissible Type LSBE Class 2C6 Form C 9 with 2 HM 825 Ball Bearing Motors 1¼" armorplate frame 44" Ga. (Can change to 36" Ga. or less) 1—Locomotive equipped with Gould Lead Battery 12 months of original guarantee, 3 Locomotive equipped with Edison Batteries with as much as 72 months in original guarantee. Length 13½' lcng. 50" high, 69" wide and 44" Wheel Base. (Can furnish 150 KW G.E. Syn. M.G. Set, 2200 v. 3 ph. 60 cy. 1200 RPM to charge above batteries.)**
3—5 Ton Type D Ironton, 36 or 44" Ga.
1—4 Ton Jeffrey 44" Ga. with Battery.
4 Ton General Electric, 36" Ga.

### (Haulage)

10 Ton Jeffrey 250 v. 36/42" Ga.
10 Ton Westgh. 250 V. 36" or 40" Ga.
8 Ton Westgh. 250 V. 42" Ga.
2—5 Ton West. 250 V. 36 or 42" Ga./with Electric Gathering Reels. Bar steel frame.

### SCREENS

2—4' x 5' single deck Tyler Hummer Screens Type 37 equipped with V-16 Vibrators No. 2860 and 2867 designed for 110 v. AC 15 cy.

### MG SETS 3 ph. 60 cy. (Syn.)

150 KW Ridgway 250 V. DC 2200 V. AC 900 RPM.
100 KW Ridgway 250 V. DC—2200 V. AC 1200 RPM.
125 KW Cr. Wh. 250 V. DC—2200 V. AC
30 KW West. 250 V. DC—220 V. AC 1150 RPM.
22½ KW Al. Ch. 125 V. DC—2200 V. AC 900 RPM.

### ENGINE GENERATOR SETS

100 KW 250 V. DC Westgh—Skinner Engine.
50 KW West. 125 V. DC—Skinner Engine.
25 KW Westinghouse 125 V. Steam Turbine.

### OIL ENGINE GENERATOR SETS

75 KW G. E. 125 v. DC V Belted to 100 HP Cooper Bessemer 2 cyl. hor. Oil Engine.

### SLIP RING & SQ. CG MOTORS (3 ph. 60 cy.)

| HP | Make | Speed | Wdg. | Type |
|---|---|---|---|---|
| 400 | West. | 500 | S.C. | Ca. |
| 200 | G.E. | 250 | S.R. | MT 412 |
| 200 | G.E. | 600 | S.R. | I-M |
| 150 | Al. Ch. | 685 | S.R. | |
| 150 | G.E. | 600 | S.R. | IM |
| 125 | Al. Ch. | 435 | S.R. | |
| 100 | G.E. | 500 | S.R. | MI-25 cy. |
| 100 | Al. Ch. | 575 | S.R. | |

### AIR COMPRESSORS

492 cu. ft. 100=C hg. Pneumatic straight line heavy duty Diesel oil driven Compressor unit.

### HOISTS

75 HP Lidgerwood sgl. fr. drum
50 HP Diamond 2 drums same Shaft
52 HP American 2 drum, AC Motor
30 HP Clyde sgl. drum AC Motor
30 HP Double drum—Tandem
15 HP Lidgerwood sgl. dr. AC Motor

### 400 TRANSFORMERS (Westgh. & GE 1 ph.)

| Qu. | KVA | Prl. V. | Sec. V. |
|---|---|---|---|
| 3 | 1 | 2080/2200 | 115/230 |
| 40 | 5 | " | " |
| 31 | 7½ | " | " |
| 28 | 10 | " | " |
| 2 | 25 | 2200 | 244/488 |
| 3 | 37 Rotary | 4400/185 | 115/230 |
| 3 | 37½ | 2200 | 220/440 |
| 3 | 50 | 22000 | 2200 |
| 3 | 75 | 2200 | 110/220 |

### AC AIR BREAKERS (unused)

8—200/400 amp. 3 pole ITE 220 v.
2—300/600 amp. 3 pole ITE 220 v.

### PUMPS

250 GPM 250= or 575' Head 2 cyl. Hor. National Transit 6" suc. 4" dis. enclosed driven by 40 HP Motor.

## MOOREHEAD-REITMEYER CO., INC.

**PITTSBURGH, PENNSYLVANIA**

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## MINING MACHINES

**AC & DC**

**REBUILT & GUARANTEED FOR IMMEDIATE SHIPMENT**

**Joy 12-BU Loader, 220 V., 3 Ph., 60 Cy. Rebuilt**

***Equipment of all kinds***

***Buy, Sell or Exchange***

## THE INDUSTRIAL EQUIPMENT CORP.

**Warehouse: Carnegie, Pa.**
**P. O. Box 1647 Pittsburgh, Pa.**

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### DIESEL UNITS

120 HP Muncie 125 V. D.C.
2—100 HP Winton 125/250 V. D.C.
32 KW Buda 125 V. D.C.
120 HP Fairbanks Morse 3/60/440 V.
185 KW DeLavergne 3/60/220 V.

### R. R. TRACK SCALES

3 Howe & Fairbanks 100, 125 & 140 Ton Cap.

### TANKS ON TOWERS

20,000 Gal. Cap. on 80 Ft. Tower
50,000 Gal. Cap. on 100 Ft. Tower
100,000 Gal. Cap. on 75 Ft. Tower

## R. C. STANHOPE, INC.

**60 East 42nd St. New York, N. Y.**

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**Link-Belt K55 Dragline 2¼ yards, 70' boom**
**Buc. Erie Steam Dragline, 6-8 yds. 175' bm.**
**Buc. Erie 50B Diesel Shovel-Dragline, 2 yds.**
**Buc. Erie Steam Crane, Model 30B, 40' bm.**
**P & H 600 Shovel-Crane, 50' boom**
**Moore Speedcrane 15 tons, gas, 63' boom**
**Northwest Model 105 Gas Shovel, 1 yd.**
**Lorain 75B Gas Shovel, 1½ yds.**
**Marion Model 32 Steam Shovel, 1½ yds.**
**Ind. Brownhoist Crane, gas, 40' boom 1 yd.**
**Brownhoist Loco. Crane 35 tons, steam**
**2—Mack Trucks 6BX, Boulder Type, 12 yds.**
**3—Sterling Trucks, 170-C, Boulder Type, 12 yds.**
**Allis Chalmers "L" Tractor with bulldozer**
**Cletrac FGC Tractor, 95 HP. with Emsco Scraper**
**Int. TD18 Diesel Tractor with bulldozer**
**Allis Chalmers "30" Tractor with bulldozer**
**American 75 ton Locomotive, steam. Rebuilt**
**American 50 ton Saddle Tank Switcher**
**Whitcomb 14 ton, 36" gauge Diesel Loco.**
**Davenport 10 ton, std. gauge, gas Loco.**
**Vulcan 8 ton, std. gauge, gas Loco.**
**Vulcan 6 ton, 36" gauge, gas Locomotive**
**Steel Storage Bin 200 tons, ⅜" plating**
**Hayward 1 yd. Clam. rehandling Bucket**
**Haiss ¾ yd. Clam. rehandling Bucket**
**Erie ¾ yd. Clam. rehandling Bucket**
**Blaw-Knox ⅞ yd. Clam. digging Bucket**
**Hayward ⅞ yd. Clam. digging Bucket.**

## RICHARD P. WALSH CO.

**30 Church St. New York 7, N. Y.**

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**USED**

## Cutting Machines

**LIKE NEW**

**4—Jeffrey Longwall Type Serial Nos. 16995-6-7-8. Model 24-B Year 1935.**

**1—Sullivan Longwall Type. Serial Number 11086.**

## Clonick Steel Co.

**2375 S. Archer Chicago, Ill.**

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### LOCOMOTIVES

1—American 41 ton, 4 wheel, saddle tank Locomotive, electric lights, steam brakes, ASME boiler, 190 lbs. Sale or rent.
1—Lima 80 ton, six wheel, Switcher with tender, National Board boiler, 200 lbs. working pressure, super heater, automatic lubrication; excellent condition, immediate delivery.
1—American 68 ton, 6 wheel, Switcher with tender, electric lights, air brakes, power reverse; overhauled.
1—Whitcomb 6 ton, 36" gauge, gasoline driven Locomotive, electric lights, starter, etc.

### CARS

8—20 yd. capacity, K & J, all steel, air dump Cars, lift type doors, cast steel side truck frames, air brakes, air dump.

### CRAWLER CRANE

1—General ¾ yd. crawler tread with ¾ yd. Blaw Knox clam shell bucket, powered with Buda diesel motor.

### OVERHEAD CRANE

1—Shepard 7½ ton, 36 ft. span, 220 volt, D.C., bucket operating.

## A. J. O'NEILL

**LANSDOWNE THEATRE BLDG.**
**LANSDOWNE, PA.**
**Philadelphia Phone: Madison 8300**

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## FOR SALE

1—One **NORDBERG Hoist** No. 06392, 4 ft. drum, hydraulic brake direct connected 150 h.p., G.E motor AC, 440 v. 3 ph. 60 cycle, speed 585, complete with panel board and ammeter.

3—One **POMONA Vertical Pump**, 75 h.p., AC, 250 v. 60 cy. 3 ph. Westinghouse motor, together with starting compensator, capacity 1000 gal. per min., 200 feet head.

4—One **ALLIS CHALMERS Pump**, type BS 13406, 100 h.p., motor AC, 220 v. 60 cy., 3 ph., capacity 1000 gal. per min., 250 feet head.

***All of the above equipment in first class operating condition***

**FS-200, Coal Age**
520 No. Michigan Ave., Chicago, Ill.

FOR
# IMMEDIATE DELIVERY
OF
# RUBBER PRODUCTS

*Conveyor Belting...Transmission Belting...Elevator Belting...Fire, Water, Air, Steam, Suction or Welding Hose, etc.*

CALL, WIRE or WRITE
## CARLYLE
THE RUBBER HEADQUARTERS

**CARLYLE RUBBER PRODUCTS ARE NEW, GUARANTEED & LOW PRICED**

## CONVEYOR BELTING

**ABRASIVE RESISTANT COVERS**

| Width | Ply | Top-Bottom | Covers | Width | Ply | Top-Bottom | Covers |
|---|---|---|---|---|---|---|---|
| 48" | 8 | 1/8" | 1/16" | 20" | 5 | 1/8" | 1/32" |
| 42" | 5 | 1/8" | 1/16" | 20" | 4 | 1/8" | 1/32" |
| 36" | 6 | 1/8" | 1/16" | 18" | 4 | 1/8" | 1/32" |
| 30" | 6 | 1/8" | 1/16" | 16" | 4 | 1/8" | 1/32" |
| 30" | 5 | 1/8" | 1/16" | 14" | 4 | 1/16" | 1/32" |
| 24" | 5 | 1/8" | 1/32" | 12" | 4 | 1/16" | 1/32" |
| 24" | 4 | 1/8" | 1/32" | | | | |

*Inquire For Prices - Mention Size and Lengths*

## TRANSMISSION BELTING

**HEAVY-DUTY FRICTION SURFACE**

| Width | Ply | Width | Ply | Width | Ply |
|---|---|---|---|---|---|
| 18" | 6 | 10" | 6 | 6" | 5 |
| 16" | 6 | 10" | 5 | 5" | 5 |
| 14" | 6 | 8" | 6 | 4" | 5 |
| 12" | 6 | 8" | 5 | 4" | 4 |
| 12" | 5 | 6" | 6 | 3" | 4 |

*Inquire For Prices - Mention Size and Lengths*

## ENDLESS "V" BELTS

"A" WIDTH All Sizes | "D" WIDTH All Sizes
"B" WIDTH All Sizes | "E" WIDTH All Sizes
"C" WIDTH All Sizes | Sold in Matched Sets

*Inquire For Prices - Mention Size and Lengths*

PROTECT THAT PLANT
## FIRE HOSE

**APPROVED SPECIFICATION HOSE**
**EACH LENGTH WITH COUPLINGS ATTACHED**

| Size | Length | Per Length |
|---|---|---|
| 2½" | 50 feet | $28.00 |
| | 25 " | 16.00 |
| 2" | 50 " | 23.00 |
| | 25 " | 13.00 |
| 1½" | 50 " | 20.00 |
| | 25 " | 11.00 |

Specify Thread On Couplings

SPECIAL OFFER . . . HEAVY DUTY
## RUBBER HOSE

**WATER HOSE**
Each Length with Couplings Attached

| I.D. Size | Length | Per Length |
|---|---|---|
| ¾" | 25 feet | $4.25 |
| 1" | 50 " | 8.00 |
| | 25 " | 6.25 |
| 1¼" | 50 " | 12.00 |
| | 25 " | 7.50 |
| | 35 " | 10.50 |
| | 40 " | 12.00 |
| 1½" | 50 " | 15.00 |
| | 25 " | 10.00 |
| | 35 " | 14.00 |
| | 50 " | 20.00 |

**AIR HOSE**

| I.D. Size | Length | per Length | Couplings |
|---|---|---|---|
| ½" | 25 feet | $5.00 | $1.50 Pair |
| | 50 " | 10.00 | 1.50 " |
| ¾" | 25 " | 6.25 | 2.50 " |
| | 50 " | 12.50 | 2.50 " |
| 1" | 25 " | 10.00 | 3.50 " |
| | 50 " | 20.00 | 3.50 " |

LARGER SIZES ALSO AVAILABLE
*All Prices—Net—F.O.B. New York*

# CARLYLE RUBBER CO., INC.
62-66 PARK PLACE — NEW YORK, N. Y.

## ★ MINING EQUIPMENT READY FOR DELIVERY ★

**CUTTING MACHINES—250 VOLT**
2—12-AB **Goodman Shortwalls**, 35-HP.
1—12-EJ **Goodman Shortwall**, 50-HP.
1—112-AA **Goodman Shortwall**, 50-HP.
1—12-A **Goodman Shortwall**, 35-HP.
1—28-A **Jeffrey Shortwall**, 30-HP.
1—29-B **Jeffrey Arcwall**, 35-HP.
1—29-B **Jeffrey Arcwall**, with 29-C Motor
2—CE-7 **Sullivan Shortwalls**

**LOCOMOTIVES—250 VOLT**
1—4-Ton **G.E.** 825, low vein with cable reel
1—6-Ton **Ironton**, low vein with cable reel
1—8-Ton **G.E.** 822 haulage
1—10-Ton **Jeffrey** MH-78 new throughout except units, 3" Armor plate frame
1—13-Ton **Westinghouse**, Type 79

**SUBSTATIONS**
1—200-KW **West.** 2200 volt Sync. Motor, 250 volt generator, complete with switchboard.
1—75-KW **West.** M-G Set, 2200 volt Sync. motor 250 volt gen., comp. with switchboard.
1—150-KW **Jeffrey** generator only.
1—100-KW **G.E.** Rotary Converter, 250 v. D.C.

**MISCELLANEOUS**
1—100-HP. Natural gas engine with 220 volt A.C. generator and complete switchboard.
1—60-HP. **Thomas** hoist, single drum
2—**Cameron** Centrifugal pumps, 650 GPM, 70' head
1—Fig. 8 incline rope drum complete
1—5'x8' **Fairmont** vibrating screen
50—A.C. and D.C. stationary motors

**LET US KNOW YOUR NEEDS—WE BUY, SELL, AND TRADE**

## ALL-STATE EQUIPMENT CO., INC.
LOGAN, W. Va. PHONE 884

## 6 YD. or 8 YD. STRIPPER SHOVEL

225 Bucyrus 80 ft. Boom, 54 ft. Dipper Stick, Steam Shovel.

## 2-4 Yds. SHOVELS

2 Marion Model, 125, Electric, 35' Boom, 25' Dipper Sticks

## DIESEL DRAGLINE

2—52B 2½ Yd. Cap. 80 ft. Boom Diesel Caterpillar Draglines.

3 Yd. P.&H. 800, 97' boom.

2½ Yd. 48B Bucyrus 80' boom.

2—2½ Marion Electric Shovels.

75—1½ & 2 Yd. Dump Cars.

**AIR COMPRESSORS:**
(7) Steam 66 ft., 300 ft., 600, 1000 & 1940 ft.
(12") Belted, 360, 676, 870, 10000, 1300 ft.
(12) Diesel 105, 315, 520, 676 & 1600 ft.
(6) Electric, 1300, 1500, 2200, 2600, 5000 ft.
(14) Gasoline, 110, 160, 220, 310 & 370 ft.

**COAL CRUSHERS:**
Jeffrey Single Roll 18x18, 24x24 & 30x30
Link Belt 26x24 Double Roll Crusher

**COAL CUTTERS:**
Sullivan CR6 Top Cutter with Government Approved D.C. Motor
6—Sullivan CR2 Short Wall Undercutters A.C. Motors
Goodman #212 Low Vein with A.C. Motor
3—Goodman 12E Short Wall with D.C. Motors

**HYDRAULIC CARWHEEL PRESSES:**
100 Ton, 150 Ton, 300 Ton, 300 & 400 Ton Caldwell - Niles - Wood - Watson Stillman

**RUBBER CONVEYOR BELTS:**
1000' 60", 600' 30", 500' 20", 1600' 42", 900' 48", 1450' 36", 1200' 24", 900' 18", 600' 16", 350' 14".

**TANKS:**
12,000 and 15,000 gal. and 20,000 gal.

**CONVEYOR PARTS:**
Idlers, Heads & Tail Pulleys, Steel Frames, Tripper, etc., 14 In., 60 In. Large stock here.

**SYNC. MOTOR GENERATORS & ROTARYS:**
100 KW Ridgway 1200 RPM 3/60/2300/250-275
150 KW G.E. 1200 RPM 3/60/2200-250-275
200 KW Ridgway 900 RPM 3/60/2200-250-275
3—100 KW G.E. 275 v. 1200 RPM Rotarys

**STORAGE BATTERY LOCOMOTIVES:**
2½ ton Witcomb 24 ga. New Batteries
2—4 ton G.E. 30 in. ga.
3—5 ton Mancha 30 in. ga.
4—5 ton G.E. 36 in. ga.
3—7 ton Goodman 36 ga. Battery & Trolley
8—6 ton Baldwin Westgh. 42 ga. & 36 ga.

**TRACK SCALE:**
150 Ton Buffalo 56 ft. R.R. Track Scale

**TROLLEY LOCOMOTIVES:**
2½ ton Westinghouse 24 ga.
4—6 ton & 3—5 ton Goodman, 36 ga.
3—6 ton Goodman 30 ga.
4—6 ton Goodman 42 ga.
5—6 ton Westinghouse 42 ga.
2—8 ton Goodman 36 ga.
10 ton Goodman 42 ga. & 13 ton Jeffrey

**VIBRATING SCREENS:**
9 Tyler Hummer 3x6, 4x5, 4x8 & 4x10
2 Robins Gyrex 4x8½
4x12 Niagara, 3x8 L. B., 5x6 Simplex

**CARS:**
60—Western 16-20-30 yd. Side Dump

**SHOVELS, CRANES & DRAGLINES:**
3 W 90' Boom, 6 & 160' Boom, Model 6150, 175' Boom, Diesel, Monighan Walkers
1 yd. K 30 Link Belt 50' Boom Crane
2 yd. Page 70' Boom Diesel Dragline
1½ yd. Marion 450 Elec. Shovel
1½ yd. Lima Diesel Shovel & Dragline
2 yd. Link Belt Elec. Shovel & Dragline
25 ton Browning 50' Boom Loco. Crane

**MINE LOADERS:**
Junior Joy 36 ga. Low Pan
Conway 20 Mucker
3—5 BU & 7 BU 36 or 42 ga. Joy
9—Goodman 200 & Jeffrey 441
7 Conway 20A, 30A, 50A, 60 & 75 Muckers

**MISCELLANEOUS:**
15 Ton Plymouth 36 ga. Diesel Locomotive
5'x160' Traylor Rotary Dryer
6—Goodman 12CA & 12DA 6 ft. Cutters
9x8 Sullivan Mine Compressors
Clamshell Buckets ¾, 1, 1½ & 2 yd. Cap.
30 ton & 12 ton Vulcan Std. Ga. Gas Loco.

**WANTED TO BUY:**
Complete Mines—M.G. Sets, Locomotives, Compressors, Conveyors, Cranes, Crushers & Rotary Converters. Also Rails, Screens, Pumps, Cars, Mine Loaders & Mining Machines.

## R. C. STANHOPE, INC.
**60 East 42nd St. — New York, N. Y.**

## ELECTRIC POWER PLANT

Motor-Generator Set—600 h.p. motor with one 325 k.w. generator, a 150 k.w. generator and exciter, direct, with three 187½ h.p. motors at 435 r.p.m.

## GUY S. MARTIN
**1605 Tower Grove Ave. — St. Louis, Mo.**
Telephone: Laclede 8500

# SEARCHLIGHT SECTION

## LOCOMOTIVES

**Goodman:** All 250 volts.
1—10 ton, 31-1-4-T.
1— 6 ton, 30B, 48" 1—5 ton.
1— 5 ton, W-1-2, 36".
1— 4 ton, 8-30.

**Westinghouse:** All 250 volt.
1—4 ton, 902, 48" 1—18 ton, 102, 42"
1—904 c. 44" 500 volt. Also 906 motors.
1—10 ton, 915.

**G.E.:** All 250 volt.
6 ton 803, 44", as is
6 ton 823, 44"
6 ton 801
8 ton 839
4 ton 1022, 41, as is
5 ton 825, 44"
8 ton 839 motors

**Jeffrey:** 6 ton, and 4 ton, all gauges, 250 volt
1—**Jeffrey** MH 110 Locomotives
1—**Jeffrey** MH 100

## MINING MACHINES

**Jeffrey,** 35B, 29B, and 4—28A, 250 V. 2—29C with drop bar support.
**Goodman,** 12A, 12AB, 12AA, 12G3A, 34B.
1—12G3 250 volt and 2—112 DA, 500 volt.
2—Permissible Type 12CA. 6—112AA, 3—124AA.
**Sullivan,** CE7, CE9, CE10, CR10 Low Vein.

## SUBSTATIONS—275 volts, D. C.

2—200 KW **GE Rotaries** (600 volt)
1—200 KW **Ridgeway** M.G. Set.
1—200 KW **G.E.** Rotary Converter.
1—200 KW **West.** Rotary.
1—150 KW **West.** Rotary.
1—200 KW, 1—100 K **Ridgeway** M-G Sets.
1—150 KW **Ridgeway** Rotary.
1—150 KW **West.** Rotary converter.
1—100 KW **West.** M-G Sets.
1— 90 KW **G.E.** Rotary.

## SPARE ARMATURES

Jeffrey MH 110, MH 78, MH 73, MH 88, 29B, 35B and 28A. Goodman 34B, 30B, 30C, 12A, 12AB, 12AA, 33-1-4-T, 31-1-4-T. General Electric 801, 803, 819, 821, 825, 839. Westinghouse 904, 906, 102, 907, YR2, 115. Also 200 KW Westinghouse Rotary Converter Armature, 250 V. Bracket Type, 150 KW G. E. HCC Bracket Type, and 150 KW G. E. TC Pedestal Type.

AERIAL TRAMWAYS * HOISTS * PUMPS * MOTORS * TRANSFORMERS * BOND WELDERS * RESISTANCE * COMPRESSORS * DUMPS * SPEED REDUCERS FIELD FRAMES * ARMATURES * GOODMAN HYDRAULIC SHOVELS * MOTOR STARTERS AND CONTROLLERS—AC & DC * DROP BAR SUPPORTS (Gooseneck), 29B and 29C * MINING MACHINE TRUCKS * SWITCHBOARDS * CIRCUIT BREAKERS—AC & DC * CONVEYOR HOISTS * COAL CRUSHERS (double roll) 12"x16", single roll 24"x36", 36"x36" CONVEYOR HOISTS, 24"x24" and 18"x16" * TURBO-GENERATOR 500 K.W. 275 volt DC * ROPE & BUTTON CONVEYOR 400' long LATHES, SHAPERS * SWITCHES * AUTOMATIC CIRCUIT BREAKERS 250 volt 600 amps to 2000 amps * MANUAL CIRCUIT BREAKERS 600 amps to 3000 amps * HOISTS, overhead, AC, 3-60-440, 1 ton and 2 ton * CAR RETARDERS, Fairmont * 1 Clam shell bucket 1¾ cubic yard, 1—Figure 8 drum * MINE CARS Solid, 22" high with rotary dump, 44" gauge * 2 SULLIVAN BIT SHARPENERS * R.R. SWITCHES 85# to 100# HOISTS 5 HP AC and DC. GENERATORS DC 250-275 volt, 30 KW to 100 KW.

## GUYAN MACHINERY COMPANY, Logan, W. Va.

# CURRENT SPECIALS

Two—Ironton type WOD double motored 42" ga combination battery-trolley locomotives (without batteries), GE 80 volt ball bearing motors, worm & worm gear drive, ball bearing trucks. Good used condition. Price subject inspection and prior sale, $1125.00 each.

One—Mansha single motored 36" ga battery locomotives (without batteries). As is, subject inspection and prior sale, $600.00 each.

One—Sullivan C67 mining machine, 3-60-220 volt, tip turn truck, cable etc.—Subject inspection and prior sale, $1050.00.

One—100 KW Allis-Chalmers rotary converter, with three 40 KVA transformers, HV 6900 LV 185-92.5, As is, subject inspection and prior sale, $1350.00.

Two—562 KW Allis-Chalmers turbo-generators, 3 phase 60 cycle 2300 volt, complete with condensers, piping, valves, wiring and switchboards. Price, $10,000.00 per unit, subject inspection and prior sale.

## HAIR EQUIPMENT COMPANY

**Office and Warehouse**
**Reed and Election Streets**
**BENTON, ILLINOIS**
*Complete Catalog on Request*

# TRANSFORMERS

**BOUGHT and SOLD**

We have several thousand transformers in stock for prompt shipment, and invite your inquiries.

**PIONEER TRANSFORMER REBUILDERS**

We rewind, repair and redesign all makes and sizes.

*One Year Guarantee*

## THE ELECTRIC SERVICE CO., INC.

"AMERICA'S USED TRANSFORMER CLEARING HOUSE"
STATION M Since 1912 CINCINNATI 27, OHIO

# FOR SALE

Browning 25 Ton Steam Locomotive Crane
Massillon 1¼ Yd. Steam Crawler Shovel
Austin ⅜ Yd. Gas Crawler Shovel

*All in excellent condition.*

**MANSBACH METAL CO.**
Logan, W. Va. Phone 1071

## FOR SALE

Streeter-Amet weight recorder complete with track scale lever system. 12000 pounds capacity. Immediate delivery.

**G. & W. H. CORSON, INC.**
**Plymouth Meeting, Pa.**

## REBUILT - GUARANTEED

1—200 KW, G.E. Rotary Converter
3—55 KVA, G.E. Rotary Transformers
3—165 KVA, G.E. Rotary Tranformers
A.C. & D.C. Rotary Control Panels
3—Oxide Film G.E. Lightning Arrestors
Oil & Air Circuit Breakers
1—1/R Portable Air Compressor
Motors: A.C. and D.C.
6—600 Ampere DB-257 Line Contactors
Power, Distribution & Current Transformers
150—5 Ampere, 110 Volt, 2 Wire Meters
3—S & C Oil Filled Fuses with Supports
1—24 Circuit Control Breaker Panel

**R. H. BENNEY EQUIPMENT COMPANY**
**NORWOOD (12), OHIO**

## FOR SALE

1—5 x 5 Twin Cylinder **Ingersoll Rand Air Compressor** Imperial 30—105 ft. per minute—with 20 HP, AC, 3 phase, 60 cycle, Electric Motor—900 speed—with General Electric Compensator. This air compressor and motor together with an 18 x 48 inch high pressure air tank, is mounted on a flat base—height overall 40 inches. Extra good condition.

1—**Lidgerwood Drum Hoist** — drum 24 inches wide, 7 inches deep—will hold 800 to 1000 ft. ¾ cable, 20 HP General Electric AC motor, direct connected—with pinion gear to hoist. Grids and reversible control. All mounted on base.

1—**Clyde Drum Hoist** with 30 HP motor, of practically the same description as above.

Also 1 Late Type **CMC Master Concrete Mixer**—portable—1 bag, with 2 cylinder Leroy engine.

Also 1 **March Capron Concrete Mixer** portable, 4 cylinder LeRoy Engine, 2 bag. These mixers are in extra good condition.

We also have a large number of AC and DC motors.

**CITY SALVAGE CO.**
**421 Glen Arvin Ave., Lexington, Ky.**

FOR SALE

## Fairbanks Morse Railroad Track Scale

**$5,500.00—Like new**
**Answer c/o P. O. Box #326**
**Pittston, Pennsylvania**

**5 YD. MARION STRIPPING STEAM SHOVEL**
Model 92, purchased new 1924; converted to Bucyrus-Erie caterpillars about 1928; Steam Boiler is now oil-fired, having been converted from coal in 1940; burns No. 5 fuel oil. Oil burner is a Best model 2N, equipped with Best steam qualifier, incl. gauge, drip cock, strainer & trap. 30'2" Boom; Many spare parts included. Machine has been in operation up to the present time.
**CONSTRUCTION INDUSTRY SERVICE COMPANY**
1819 Broadway New York (23), N. Y.

## HOIST

1—Ottumwa double drum, single gear reduction Electric Shaft Hoist, complete, in first-class condition, with 60 horsepower, 600 revolution, 220 volt, 3 phase, 60 cycle, General Electric motor.

**LESLIE E. BRYANT**
Clarksville, Arkansas

## New "SEARCHLIGHT" Advertisements

received by December 28th will appear in January issue, subject to space limitations.

*Departmental Staff*

**COAL AGE**
**330 West 42nd St., New York 18, N. Y.**

# REBUILT EQUIPMENT—READY TO SHIP

**MINING MACHINES—250 v. DC**
1—CE-7 Sullivan 36" gauge
2—7 A.U. Sullivan Track Mt'd. 550 v. DC
2—Sullivan 5B Buddy Mining Machines 230 v. DC 5' bar, 2½" kerf.
2—Armatures for CE-7 Sullivan 250 v. D.C.

**MINE LOCOMOTIVES**
1—3½ ton Ironton Battery 36" ga.
1—6 ton Atlas 4000# D.B.P. with AC or DC Motors 36" ga.
1—10 ton Milwaukee Gasoline
1—12 ton G.E.-53 500/550 v. 42" ga.

**ROTARY CONVERTERS**
1—500 kw. G.E. type HC-28, 400 volt, 900 rpm, complete with transformers and switchboards
200 kw. G.E. 275 v. DC 900 rpm complete with transformers
2—400 kw. G.E. 250 V. D.C. 600 rpm., 2300 v. A.C. complete

**HOISTS**
100 HP, Lidgerwood 2 drum AC or DC Motor

**CENTRIFUGAL PUMPS**
2—1000 G.P.M. Cameron bronze, 100' hd. 8 x 8
1—800 G.P.M. Weinman 90' hd. 6 x 5
2—160 G.P.M. Deming Triplex 150# 335' hd. 6 x 8

**DIESEL ENGINE SET**
1—217 KVA G.E. 2300/220/440 v. 3 ph. 60 cy. rpm, dir. con. to 260 HP Buckeye horiz. 2 cyl. Diesel.
1—100 KW West., 250 v. DC, 900 rpm., V-belted, 185 HP Venn Severin oil engine, 280 rpm., 3 cylinders, vertical, complete with air compressor, tanks, pumps, belts, etc.

**TRANSFORMERS—1 ph. 60 cy.**

| No. | Kva. | Pri. | Sec. | Make |
|---|---|---|---|---|
| 1 | 250 | 2300 | 460 | G.E. |
| 1 | 100 | 2200 | 110/220 | G.E. |
| 3 | 100 | 6600 | 550/440/220 | Pgh. |
| 3 | 50 | 11430/6600 | 550 | Al. Ch. |
| 3 | 50 | 6600 | 575 | G. E. |
| 1 | 37½ | 2300 | 220/440 | Wagner |
| 3 | 37 | 4400 | 185 | West.(Rotary) |
| 35 | 10 | 2200 | 110/220 | G. E. |
| 100 | 7½ | 2200 | 110/220 | G. E. |
| 75 | 5 | 2200 | 110/220 | West. |

**SLIPRING MOTORS—3 ph. 60 cy.**

| HP | Make | Type | Volts | RPM |
|---|---|---|---|---|
| 400 | Westg. | CW | 440/220 | 1170 |
| 300 | Westg. | CW-1106 | 2200 | 580 |
| 250 | Westg. | CW | 2200 | 345 |
| 100 | G. E. | I | 220 | 450 |
| 100 | Westg. | CI | 220/440 | 1750 |
| 75 | Cr. Wh. | | 220/440 | 875 |
| 60 | Triumph | C-16 | 220/440 | 430 |
| 60 | Westg. | HF | 2200 | 690 |
| 53 | G. E. | I | 220/550 | 1165 |

**230 V. DC MOTORS**

| HP | Make | RPM | Type |
|---|---|---|---|
| 30 | Westg. | 1150 | SK-110L |
| 35 | Westg. | 675 | SK-140 |
| 125 | Morg. Gardner | 425 | ——— |
| 150 | G. E. | 500 | MPC-6 |
| 150 | Cr. Wheeler | 625 | CCD |
| 200 | Cr. Wh. | 477 | CCD |
| 250 | Cr. Wheeler | 200/400 | CMC |
| 300 | Otis | 550 | ——— |

(With spare armature)

**MOTOR GENERATOR SETS**

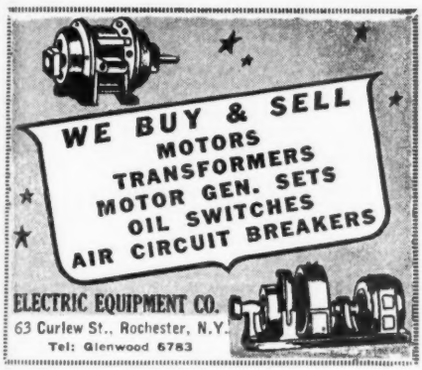
150 Crocker Wheeler 250 v. D. C. 600 rpm., 200/440 or 2300 v. Syn. Motor

125 kw. Crocker Wheeler 250 V. D.C. 1200 rpm., 220/440 v. 3 ph. 60 cy. Ind. Motor

**SCALES**

9—Howe No. 2734, 3 beams (2 at 200 lbs.—1 at 50 lbs.) Platform 14½ x 22", cap. 500#

## DUQUESNE ELECTRIC & MFG. . . . . PITTSBURGH (6), PA.




## IRON and STEEL PIPE

*New and Used*

Large stocks, all sizes attractive prices

**L. B. FOSTER COMPANY**

P. O. Box 1647 Pittsburgh 30, Pa.

## MINE HOISTS

1—Lidgerwood 42" Band friction 4000'-⅞" rope—100 or 150 HP motor.
1—Vulcan 30" Band friction will coil 3000 ¾" rope 50 or 60 HP motor.
1—Connellsville 54" Band friction will coil 5000 ft. ⅞" rope 100 or 150 HP motor.
1—Lidgerwood 60" Band friction will coil 650 ft. 1⅛" rope with 200 to 350 HP motor.
1—Vulcan 60" Sliding pinion will coil 3500 ft. 1⅛" rope. 200 HP motor.
1—Lidgerwood-Cylindro Conical Shaft Hoist—225 ft. 1¼" rope. 300 HP motor.
1—Vulcan-Cylindro Conical Shaft Hoist 350' 1⅜" rope. 400 HP motor.
1—Connellsville-Cylindro Conical Shaft Hoist 350' 1½" rope. 800 HP motor.

*And other hoists to suit all mining conditions*

**Jones Mining Equipment Co.**

541 Wood Street Pittsburgh, Pa.

**ROTARY CONVERTERS**

500 KW G.E. SYN. 275 V. 6 Ph., 60 Cy., 1200 RPM, Pedestal Type, 2300/4000 V. Transformers.
500 KW AL-CH SYN. 275 V. 6 Ph., 60 Cy., 1200 RPM, Pedestal Type, 2300/4000 V. Transformers.
500 KW WEST. SYN. 275 V. 6 Ph., 60 Cy., 1200 RPM, Pedestal Type, 2300/4000 V. Transformers.
300 KW G.E. SYN. 575 V. HCC, 6 Ph., 60 Cy., 1200 RPM, form P, 2300/4000 V. Transformers.
200 KW G. E. SYN. 275 V. 6 Ph., 60 Cy., 1200 RPM, Bracket Type, 2300/4000 V. Transformers.
200 KW AL-CH SYN. 275 V. 6 Ph., 60 Cy., 1200 RPM, Pedestal Type, 2300/4000 V. Transformers.
150 KW G.E. SYN. 275 V. HCC, 6 Ph., 60 Cy., 1200 RPM, form P, 2300/4000 V. Transformers.

**MOTOR GENERATORS**

300 KW RIDGWAY SYN., 275 V., 2300/4000 V., 3 Ph., 60 Cy., 720 RPM, Manual Switchgear.
200 KW G.E. IND., 600 V., 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM, Manual Switchgear.
200 KW R.W. SYN., 275 V., 2300/4000 V., 3 Ph., 60 Cy., 900 RPM, 80% P.F. Manual Switchgear.

**LOCOMOTIVES**

13-T WESTGHE, 250 V., 908-C Mts., 36"-36" Ga.
10-T WESTGHE, 250 V., 907-C Mts., 36"-44" Ga.
10-T WESTGHE, 500 V., 907-C Mts., 36"-44" Ga.
8-T WESTGHE, 250 V., 906-C Mts., 36"-44" Ga.
8-T WESTGHE, 500 V., 906-C Mts., 36"-44" Ga.
8-T GOODMAN, 250 V., 132-A Mts., 36"-44" Ga.
6-T WESTGHE, 250 V., 904-C Mts., 36"-44" Ga.
4-T WESTGHE, 250 V., 902-C Mts., 36" Ga.

*Each unit listed above is owned by us and is available now for immediate purchase.*

**WALLACE E. KIRK COMPANY**

Incorporated

501 Grant Building Pittsburgh, Pa.

## PIPE—MACHINERY—GAS ENGINES
## AIR COMPRESSORS—DIESELS—PUMPS

Some Steam Engines and Boilers available only slightly above the metal price

**BRADFORD SUPPLY COMPANY**

WAYNE, WOOD COUNTY, OHIO Near Toledo

1—75 KW Motor Generator Set consisting of Westinghouse 75 KW 250 Volt 1200 RPM D.C. generator Serial No. 1320494, type SK, and Allis-Chalmers 3 phase, 60 cycle, 1200 RPM 480 Volt synchronous motor Serial No. 106705. Both machines mounted on common base and coupled together
1—D. C. switchboard panel
1—A. C. switchboard panel
1—Fairbanks-Morse motor starter with overload trip
3—37½ KVA 2300-460/230 Volt G. E. transformers
1—5 KW, 440-110/220 Volt G. E. transformer

This equipment is in A-1 condition. We are selling because we moved our mine and could not get electric to run the outfit.

**TEN X COAL COMPANY**

Route 6, South River Road

Roseville 3682 Zanesville, Ohio

## MINE EQUIPMENT

100 Kw Gen. Elec. Rotary 250/2300 V
6600, 2200 & 440 Volt Transformers
24"x20" Jeffrey 2 Roll Coke Crusher
18"x30" McLanahan Coal Crusher
50 Hp Lidgerwood Dougle Drum Hoist
R113 Mine Locomotive Controllers
2750 GPM Synch. Mtr. Driven Pumps
600 GPM D.C. Mtr. Deep Well Pumps
350 Hp 3/60/2200 V Weco S.R. Motor
250 Hp 3/60/2200 V Weco S.R. Motor
200 Hp 3/60/2200 V Geco S.R. Motor

Large Stock—A.C. & D.C. Motors
Switchboards Built to Order

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**A DEPENDABLE SOURCE for**

## HEAVY EQUIPMENT

CARS — CRANES — COMPRESSORS
DRAGLINES — LOCOMOTIVES
SHOVELS—TRACTORS—ETC.

WE WELCOME YOUR INQUIRIES

WE WILL FIGURE WITH YOU ON YOUR SURPLUS

**B. M. WEISS CO.**

Girard Trust Bldg. Phila, Pa.

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# WOOD PIPE for Mine Drainage

Wyckoff Wood Pipe has an 88 year record of perfect resistance to the corrosive action of sulphurous mine water. It is an ideal, long-time investment—light, easy to lay, and relatively low in first cost.

We also manufacture a special Hard Maple Pipe for flushing culm in the Anthracite Region and wood covering for underground steam lines.

Established 1855

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**Office and Factory**
**No. 35 Home Street, Elmira, N. Y.**
**The Originators of Machine Made Wood Pipe**

## *Keep asking for*
## AMERICAN CABLE
## TRU•LAY
## PREFORMED
## WIRE ROPE

## *Because...*
## it refuses to porcupine!

• When the outer wires of **TRU-LAY PREFORMED** finally break after long use, they do not "porcupine" and stick out from the rope as do the broken crown wires of non-preformed rope. They do not become dangerous, chisel-sharp jaggers that will tear men's hands even through stoutest gloves. Naturally this advantage enables men to work better with **TRU-LAY PREFORMED.** They handle it with speed and confidence. They know **TRU-LAY** is a much safer rope to handle.

**TRU-LAY PREFORMED's** refusal to porcupine affords protection for its own sake, as well as for sheaves, drums, and other equipment which can be injured by protruding wires. Thus, this single feature (one out of many) protects your workmen against dangerous, time-out accidents—extends the service life of your wire rope—reduces needless wear to your equipment.

*No wonder the Armed Forces took so much of our production!*

**AMERICAN CABLE DIVISION**

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Portland, Tacoma

**AMERICAN CHAIN & CABLE COMPANY, INC.**

BRIDGEPORT, CONNECTICUT

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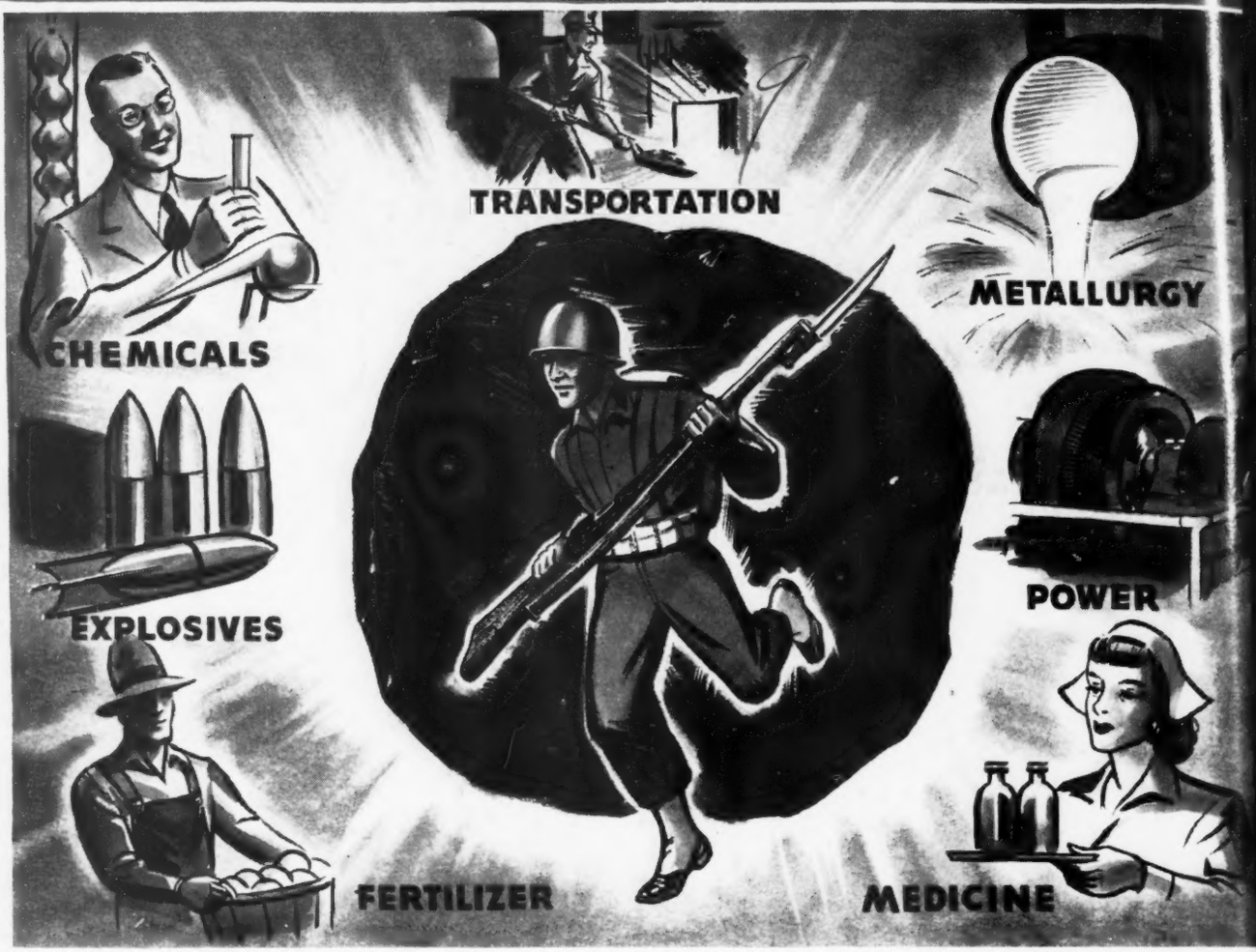


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Coal is the basic material essential to industry—working to speed the day of Victory. Power for processing, manufacturing and transporting every item of civilian or military use comes principally from coal. Heat for homes and industry, chemicals for explosives, synthetic materials and fertilizers, drugs for easing the pain and preventing infection of our wounded fighters, are all derived from coal.

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To the coal industry we pledge our assistance and cooperation. In the future as in the past, our skill, experience and facilities will be at your service.

**LINK-BELT COMPANY**

Chicago 9, Philadelphia 40, Pittsburgh 19, Wilkes-Barre,
Huntington, W. Va., Denver 2, Kansas City 6, Mo.,
Cleveland 13, Indianapolis 6, Detroit 4,
St. Louis 1, Seattle 4,
Toronto 8, Vancouver

Chicago Plants  Indianapolis Plant  Ordnance Plant

9370

# LINK-BELT

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COAL HANDLING and PREPARATION EQUIPMENT